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# Ketchak - Dance of Bone

Originally the ketchak was a choir of men who by their litanies cooperated with the Sanghyang girl that was to be put into a trance. The intention of any Sanghyang (trance) performance was that the girl while in a state of trance (semi-consciousness) would be capable of hearing and telling the wishes of the gods or of the ancestors.

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At present this ketchak is also performed with a special story (libretto). This story has been chosen from the Ramayana saga. Very condensed, the contents of the Ramayana saga are as follows :

By intrigue Rama, the legal heir to the throne of Ayodhya, is exiled from the realm of his father Dasaratha. Accompanied by his wife Sita and his younger brother Laksamana he moves from his father's palace and goes into the forest. Here he goes through many adventures and finally he is chasing the deer with the golden horns. At a certain moment his wife Sita remains alone without protection. Then she is kidnaped by the followers of Rawana, the king of the demons. After that, Rama with the assistance of the army of monkeys, under the command of Hanuman, attacks the residence of Rawana, called Lengkapura (Ceylon).

The monkeys are building a weir of bridge between Hindustan and Lengkapura and the battle ends with the victory of Rama. Some episodes from this saga are represented in the dance of the principal figures :

1. After the departure of Rama, Sita is speaking to his younger brother Laksamana. Sita orders him to go and help Rama who has persued the deer with the golden horns, because Sita hears a call for help, thinking it is Rama, who calls for help.
2. Sita, already kidnaped by Rawana, is staying at a bower in his palace. There she is visited by Rawana, who asks her hand for marriage. She then burst all into tears.
3. Rama marches out to Lengkapura to rescue Sita, his wife. He meets Meganada, Rawana's son and becomes involved in a combat with the demon. Meganada shoots his arrow, which turns into a serpent and ties Rama up like a rope.
4. Rama tied up, beseeches the gods to help him. Then Wishnu's bird, Garuda, is sent to free Rama.
5. Hanuman, the king of the monkey talks with his generals and mobilizes his army for a battle against Lengkapura. The performance ends with the battle-scene between the army of Hanuman (monkeys) and the army of Rawana (Rakshashas or demons).

N.V. Travel Bureau „BALITOUR”  
Denpasar ( Bali )

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Collection and Field Note Book

No. 53

(Nov. 5, 1958 - Jan. 20, 1959)

(39651 - 39809)

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### EXCURSION III

to

Baluran (East Java) and Bali

by Bus.

- Dec. 22. Leaving Tjiawi at 6.00 a.m. for Solo in Central Java via Bandung, Tjirebon, Tegal, Semarang and Salatiga. It will be a heavy journey this day. Midway Tjiawi-Bandung we will see some plantations of teak, which are truly out of bounds from an ecological angle: the annual rainfall is too high; age about 10 years. Afterwards the bus climbs along the slopes of bare hills: G. Missigit tertiary formations of limestone. Bandung will be reached at 8.30; the capital of West Java, well-known since the Asia-Africa Conference in 1956; Centre of Institutes devoted to the study of the Natural Sciences, Physics, etc. Leaving Bandung on our left hand the volcano Tangkuban-prahu, which is still active, on the slopes of which are cultivated Cinchona and Pinus merkusii. For some kilometres we will drive along ravines with picturesque landscapes, with Bamboo, Eupatorium palescens and Alsophila spp. Entering the plains of Tjirebon on our right hand we see the Nunuk hills, which are severely eroded. These plains are the most western part of Java where sugar cane can be grown. From here the region with a distinct monsoon climate starts. From Tjirebon to Semarang the road follows the north coast of Central Java. This is a region where onions are grown on a large scale and further more sugar cane and rice. Lunch will be at Tegal at 13.00. At 5.00 p.m. we will be passing through Semarang the Capital of Central Java. Along the road to Salatiga we see Myristica fragrans (nutmeg) and Hevea plantations. At sunset we will have left Salatiga and we hope to arrive at the Dana-Hotel in Solo at 7.00 p.m. Solo is the Centre of Javanese art and culture. The Sunan has his palace here.
- Dec. 23. Solo - Madiun - Gempol - Pasirputih. Depature from the Dana-Hotel at 7.00 a.m. For an hour the journey is not very interesting: wide plains just ploughed for growing rice in the next wet season.



After crossing the border between Central and East Java (after about one hour and a half) we will be driving through teak plantations, most of which are devastated by cattle.

Typical species of the Malaysian Monsoon Forests will be seen here, some of which are: *Acacia leucophloea*, *Schleichera oleosa*, *Schoutenia ovata*, *Butea monosperma*, *Lagerstroemia cinerea*, *Homalium tomentosum*.

Before Ngawi near Trinil, Dubois discovered the famous *Pitecanthropus erectus* dating from the middle-pleistocene.

The volcano on our right hand is the Lawu.

After Madiun we will see again some teak forests of various age.

Just after Kertosono the river Brantas will be crossed; this river causes trouble every year by its floods.

Between Djombang and Modjokerto was the centre of the 13th century kingdom of Modjopahit. In a museum in Trowulan, near Modjokerto, some antiquities from those times are conserved.

At 1.00 p.m. lunch will be served at Gempol.

The afternoon-trip after Gempol along the north coast of East Java will be for about 3 hours via Pasuruan, Probolinggo. End of this day's journey will be Pasir-putih (White sands); staying the night over here in rest-houses on the beach.

### The Baluran region

This region centering around the extinct Baluran volcano is characterized by its dry climate (less than 1000 mm annually) with a severe dry monsoon of 10 months. In the dry season dry winds come down from the Idjen Pass (600 ft.).

There are practically no rivers. The soil, originally lava, has changed into heavy, black earth, strewn with basalt and andezite blocks.

The vegetation is savana-like, along the small mountain streams we find gallery forest. During the dry season the vegetation burns regularly, which prevents the re-establishment of the forest. The latter is well developed towards the summit of the Baluran.

Many plants have subterranean parts enabling them to survive drought and fire, such as *Dioscorea hispida*, *Asparagus racemosus*, *Crinum asiaticum* and some orchids (*Plantanthera susannae*, *Pogonia nervillia*).

The trees are deciduous and flower often on the bare branches, e.g. *Dillenia pentagyna*.



Of the grasses the most common is *Andropogon amboinicus*, f. *genuinus*, which becomes more than 2 m tall. Other species are *A. parviflora*, *A. zollingeri*, *A. triticus*, *A. contortus* and *A. subtilis*. Other tall grasses are *Rottboelia exaltata* and *Ophiurus exaltata*, which remind one of a horses tail.

*Themeda argueus* is also common.

Among the trees the most conspicuous are *Acacia leucophloea* with yellow-white bark.

The Palmae are represented by *Borassus flabellifer* and *Corypha gebanga*.

Scattered here and there we find *Ficus superba* (krasak), and in the driest places a thorny scrub consisting of *Feronia elephantum*, *Aegle marmelos*, *Acacia tomentosa* *Homalium tomentosum*.

We also encounter *Schleichera trijuga* (Kosambi), *Protium javanicum*, *Grewia*, *Phyllanthus emblica*, *Melia Azedarach*, *Albizia lebbeckoides* and *A. procera*, *Cordia obliqua*, *Morinda tinctoria* and *Schoutenia ovata*, *Tamarindus indica*.

On level ground where the heavy impermeable black soil is deeply cracked during the dry season, the grass cover is thinner and *Zizyphus mauritiana* is common, often with an abundance of *Ipomoea heterophylla*.

At the margins of the open places occur the yellow-flowering *Abutilon indicus* and *Thespesia lampas*, in moister places *Ophioglossum reticulatum*.

*Rauvolfia serpentina* grows in the better parts of the forest, *Butea monosperma*, the flame of the forest, is common in teak plantations. The teak does not do very well here.



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F. A. Fosberg  
field notebook no. 32

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1958 Maryland

1

Nov. 5 - Trip by Pennsylvania  
R.R. from Washington to New  
York - left side of train.

Fall coloring about at its  
height a little past.

Leaves almost all fallen  
from *Liriodendron*, *Robinia*,  
*Betula nigra*, and some *Platanus*.  
*Fagus* bare, branchlets green color.

*Liquidambar* about at  
its best, with a range  
from yellow through orange  
to reds and purples. *Acer*  
*rubrum* very striking, from  
bright yellow to bright red.

*Nyssa* scarlet but some  
trees bare. *Quercus alba*  
dull purple but mostly  
already gray-brown. *Quercus*  
*velutina* mostly already brown.  
*Quercus coccinea* deep red  
to maroon. *Quercus palustris*  
orange-brown to reddish.

*Quercus phellos* greenish brown.  
<sup>in places</sup> nearly bare. *Quercus* <sup>sp.</sup> *alba*?  
orange-red-brown. There  
seems to be considerable  
variation in stage of change  
according to habitat variation.

Extensive pine-land along  
w. south of Odenton.

North of here the season  
becomes rapidly more advanced  
mostly oaks and willows still  
with leaves.



What appears to be a magnolia bog across from the big Westinghouse plant south of big dual highway, several miles south of Calvert Distillery, south of Baltimore.

North of Baltimore there seems little difference from the situation described for north of Washington. The season seems much less advanced than it is immediately south of Baltimore. Perhaps the differences may be more physiographic than climatic.

Small Magnolia swamps along left side just south of first large arm of bay crossed by track. In this arm are large areas of marsh now completely straw colored, west of track some distance.

Same variation in apparent stage of advancement of season noted north of Aberdeen. It seems really only a matter of the forest type concerned, those where

the dominant trees are mostly bare seem more advanced.

North of Philadelphia the trees are not entirely bare, but more so than southward, and the colors are much less evident.

In New Jersey there is little color left, except in the shrub layers. Some trees are still green, however. This probably generally reflects the extremely wet season this past summer, and the lack of hard frosts. The oak leaves are mostly brown. *Petula populifolia* and *Populus tremuloides* (or *P. grandidentata*) are yellow. *Liquidambar*, though not abundant, is very well colored.

The conspicuous coloration in the shrub layers in woods where the trees are already bare should be emphasized. Most of the shrubs could not be identified from a distance, but some are *Acer rubrum*.







From here on flying over a vast sea of cumulus clouds with a continuous cloud layer overhead. Altitude of plane 12,000'. Top of cloud layer well below, at first lumpy and billowy, later fairly smooth. Upper layer well above and featureless. Space between very clear, visibility excellent between layers. A very sharp horizon, at least in northwest quadrant, white below against dark gray. Horizon also to south, but dark gray below against semi-transparent gray above and above this a rather clear band with some irregular clouds. Above this dark gray featureless stratus clouds.

Thinned out between Dayton, O. and Indianapolis, over almost solidly cultivated land.

## SAN FRANCISCO CHIEF

Train 2, Eastbound  
California to Chicago  
Pullman, Chair Car Train

Miles	Read Down	Altitude	Miles	Read Down
0	San Francisco (PST) Cal. 11:15 AM	4225	1428	Ar Clovis (MST) N.M. 2:45 PM
7	Ar OAKLAND Cal. 11:25 AM			At Clovis turn watchmen ATTEND one hour.
10	Ar BERKELEY Cal. 11:35 AM			Richmond-Houston and Los Angeles Dallas Pullman and Chair Car switched to Train 78 at Clovis.
18	Ar RICHMOND Cal. 11:54 AM			Train 26 Lv. Clovis 8:45 am. Ar. Clovis 1:00 pm. to connect with Train 2.
26	Lv PINOLE Cal. 12:14 PM	4225	1428	Lv CLOVIS (CST) N.M. 4:20 PM
52	Lv PITTSBURG Cal. 12:47 PM	4138	1437	Lv FARWELL-TEXICO Tex. 4:31 PM
	Cross Old River 1:08 PM	4006	1463	Lv FRIONA Tex. 4:52 PM
	Cross San Joaquin River 1:19 PM	3798	1486	Lv HEREFORD Tex. 5:12 PM
86	Lv STOCKTON Cal. 1:24 PM	3626	1514	Lv CANYON Tex. 5:38 PM
	Cross Stanislaus River 1:48 PM	3667	1532	Ar AMARILLO Tex. 6:00 PM
112	Lv RIVERBANK Cal. 1:49 PM			Train 94, Lv. Lubbock 3:05 pm. Ar. Amarillo 5:25 pm. where Chicago Pullman joins Train 2.
118	Lv EMPIRE Cal. 1:55 PM			Lv AMARILLO Tex. 6:10 PM
	Cross Tule River 1:58 PM	3662	1532	Lv PANHANDLE Tex. 6:35 PM
	Cross Merced River 2:18 PM	3443	1559	Lv PAMPA Tex. 6:59 PM
151	Lv MERCED Cal. 2:30 PM	3226	1586	Lv MIAMI Tex. 7:21 PM
	Cross Choechilla River 2:48 PM	2736	1608	Lv CANADIAN Tex. 7:45 PM
	Cross Fresno River 2:59 PM	2344	1630	Lv HIGGINS Tex. 8:12 PM
	Cross San Joaquin River 3:10 PM	2560	1656	Lv SHATTUCK Okla. 8:30 PM
209	Lv FRESNO Cal. 3:30 PM	2237	1670	Lv GAGE Okla. 8:41 PM
	Cross Kings River 3:40 PM	2128	1678	Lv WOODWARD Okla. 9:12 PM
248	Lv HANFORD Cal. 4:05 PM	1904	1702	Lv WAYNOKA Okla. 10:05 PM
335	Lv WASCO Cal. 4:48 PM	1464	1737	Lv ALVA Okla. 10:27 PM
350	Lv SHATTER Cal. 4:56 PM	1327	1758	Lv KIOWA Kan. 10:50 PM
404	Ar BAKERSFIELD Cal. 5:25 PM	1326	1766	Lv ATTICA Kan. 11:14 PM
404	Lv BAKERSFIELD Cal. 5:30 PM	1443	1787	Lv HARPER Kan. 11:53 PM
705	Lv MOJAVE Cal. 7:50 PM	1417	1799	Lv WELLINGTON Kan. 12:20 AM
408	Lv EDWARDS Cal. 8:11 PM	1205	1844	Lv WICHITA Kan. 1:10 AM
457	Cross Mojave River 8:08 PM	1312	1878	Lv NEWTON Kan. 2:05 AM
458	Ar BARSTOW Cal. 9:10 PM	1445	1905	Ar EMPORIA Kan. 3:10 AM
458	Lv BARSTOW Cal. 9:20 PM	1138	1978	Lv TOPERA Kan. 4:25 AM
476	Lv NEEDLES (PST) Cal. 12:05 AM	839	2039	Lv LAWRENCE Kan. 5:50 AM
	Leaving Needles turn watchmen ATTEND one hour.	811	2066	Cross Kan.-Mo. boundary 5:58 AM
635	Cross Colorado River, Calif.-Ariz. boundary 1:17 AM	2104		Ar KANSAS CITY Mo. 6:00 AM
684	Ar KINGMAN (MST) Ariz. 12:14 AM	781	2105	Ar KANSAS CITY Mo. 6:30 AM
777	Lv SELIGMAN Ariz. 3:52 AM	781	2105	Cross Missouri River 7:05 AM
797	Lv ASH FORK Ariz. 4:25 AM	2131		Lv CARROLLTON Mo. 7:39 AM
824	Ar WILLIAMS Ariz. 5:15 AM	664	2170	Cross Grand River 7:50 AM
	For Grand Canyon Lv. Williams 7:40 am. via motor coach. Ar. Grand Canyon 9:25 am.	2186		Ar MARCELINE Mo. 8:10 AM
851	Cross Arizona Divide 5:45 AM	857	2209	Cross Chariton River 8:50 AM
858	Ar FLAGSTAFF Ariz. 5:53 AM	913	2244	Lv LA PLATA Mo. 9:44 AM
889	Cross Canyon Diablo 6:28 AM	2277		Cross N. Palms River 9:11 AM
916	Lv WINSLOW Ariz. 6:50 AM	2288		Cross Wymond River 9:18 AM
919	Cross Little Colorado River 6:58 AM	2305		Cross Des Moines River 9:43 AM
948	Lv HOLBROOK Ariz. 7:19 AM			Missouri-Iowa boundary 9:55 AM
1022	Cross Ariz.-N.M. boundary 8:14 AM	521	2321	Lv SHOPTON Ia. 9:55 AM
1043	Lv GALLUP N. Mex. 8:30 AM	523	2322	Lv FT. MADISON Ia. 10:00 AM
	Cross Continental Divide 8:07 AM	2323		Cross Mississippi River 10:08 AM
	Cross Rio Puerco 10:27 AM			Iowa-Illinois boundary 10:08 AM
4785	Ar BELEN N. Mex. 10:50 AM	755	2377	Lv GALESBURG Ill. 10:50 AM
	For Albuquerque take motor coach Lv. Belen 11:00 am. Ar Albuquerque 11:55 am.	2392		Cross Spaw River 11:05 AM
	Lv Albuquerque 9:50 am. Ar. Belen 10:50 am. via motor coach to connect with Train 2.	515	2425	Lv CHILLICOTHE Ill. 11:35 AM
		2427		Cross Illinois River 11:37 AM
		2464		Cross Vermilion River 11:59 AM
		625	2465	Lv STREATOR Ill. 12:15 PM
		2502		Cross Kankakee River 12:30 PM
4785	1188 Lv BELEN N. Mex. 11:00 AM	549	2517	Lv JOLIET Ill. 1:05 PM
1192	Cross Rio Grande 11:05 AM	2531		Cross Des Plaines River 1:30 PM
5952	Ar VAUGHN N. Mex. 12:45 PM	2544		Cross Des Plaines River 1:40 PM
4040	1368 Lv FT. SUMNER N. Mex. 11:48 PM	598	2555	Ar CHICAGO (CST) Ill. 2:00 PM

Rail-Auto Service available. Stops to receive passengers for Belen and beyond.  
 Stops to discharge passengers from Bakersfield and beyond or receive for Clovis and beyond.  
 Stops to receive passengers for Clovis and beyond and discharge from North of Bakersfield.  
 Stops to discharge passengers from Woodward, Canadian, Pampa, Amarillo, Hereford, Clovis, Ft. Sumner, Vaughn, Belen and scheduled stops Williams and beyond. Flag stop.  
 Stops to receive passengers for Chicago and beyond and to discharge passengers from Woodward, Canadian, Pampa, Amarillo, Hereford, Clovis, Ft. Sumner, Vaughn, Belen and scheduled stops Williams and beyond. Stops to receive for Clovis and beyond.  
 Stops to receive passengers for Clovis and beyond or discharge from Belen and beyond.

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**HANDLING OF BAGGAGE** for passengers traveling to San Francisco. The attendant in each chair car and porters of each Pullman will contact passengers traveling to San Francisco and place a check on hand luggage, giving you a stub. This checked luggage will be unloaded at Richmond and moved by truck direct to the Santa Fe passenger terminal in downtown San Francisco. It will be ready for you when you arrive at the terminal. This service has been arranged to avoid any delay or inconvenience in handling your luggage to San Francisco.

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At Clovis there is a short stop for leg stretching while train is being serviced. At other stops the schedule does not permit passengers to leave the train.

Thank you—happy traveling



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*Thank you—happy traveling*

Nov. 16 - Railroad trip, Santa Fe (A.T. & P.F.) route from Richmond along the upper San Francisco Bay to the San Joaquin Valley.

Grassy hills along south side of bay completely dry and dull gray brown, except for occasional scattered broad-leaved plants. Patches of planted Eucalyptus. Grindelia in flower along track, Foeniculum vulgare. A few small marshes in ravines emptying into bay. Some with Salicornia, mostly with Typha. Some along the shore on flat low ground. On hills in places scattered dark green Baccharis pilularis. Ravines have Salix, Quercus, etc.

Beyond Pinole are higher hills. To left of route, with patches of coastal sage, open oak forest, and ravines with oak forest. Otherwise dry grass and patches of late autumnal herbs. More woody vegetation eastward.



Most of the oaks are evergreen, doubtless both *Q. agrifolia* and *Q. chrysolepis* represented, as aspect is varied. Some *Juglans californica*.

North slopes beyond tunnel at Glenn Frases covered by open oak forest. South slopes with grass and oak savanna.

Some orchards and vineyards on hills but not in good shape.

Out of the hills, directly north of Mt. Diablo, are extensive marshes of quite varied aspect. These lie on flats between rounded grassy hills and Suisun Bay. Some flat land not low enough to be marshy.

Many large refineries and chemical works and other factories. These around Pittsburgh.

Beyond Antioch mostly vineyards and orchards. Rows of Eucalyptus. Ground somewhat rolling, sandy. Some marsh locally. A few oaks very locally.

### Old River

Near ~~San Joaquin River~~ vast areas of low intensively cultivated land in truck crops, crossed by large canals and channels of the river lined by banks of *Scirpus*, some *Typha*, <sup>some Phragmites</sup> patches of *Salix*, great masses of floating *Jussiaea californica* and *Eichhornia crassipes*.

One of the crops is asparagus.

Eastward in this area is considerable blowing dust, west of Holt.

South of Stockton - flat cultivated land with scattered large *Quercus lobata*, bare or partially so at this season.

Much snow visible in high Sierras to the east.

Between Hughson and Denair, to east of track, what appears to be a vernal pool. (about 1 1/2 mi. before Denair).

Dominant agricultural types from Merced to beyond Placinda orchards and some vineyards. Around Placinda large acreage of figs, mostly trimmed down



To a dwarfed spreading stature. South of Placerville the route goes for a short distance through rolling grassland, then more orchards, large areas of irrigated land. After Le Grand large areas of slightly rolling grassland and dry farming. Soil a light brown, varying to chestnut and light and dark gray.

Wooded banks along dry sandy channels of Chowchilla River.

Last areas of rolling essentially treeless dry farmed land between Chowchilla and Fresno Rivers. more luxuriant around Madera.

South of Fresno the country is intensively cultivated, largely in cotton.

Near Kings River and just south of it is rather close savanna or open forest of large oaks, either *Q. lobata* or *Q. douglasii*.

About 5 minutes south of Hanford is an area of short grass, probably *Distichlis*

with winding shallow channels with shallow water and scattered *Salix*. Farther on other similar areas with dry short herbaceous vegetation rather than *Distichlis*. These areas may be alkaline. Generally the country is farmed. Soils are generally of a light gray color. *Salsolea* seems to be the principal weed.

What appears to be the old Tulare Lake bed (72 mi. <sup>W. of</sup> ~~from~~ Wares), is an extremely sparsely populated area, extending for miles without a house. Much of it is cultivated but some seems to be in a sparse very short grass, with scattered *Salsolea*.

Some snow in Tehachapi Pass.



Nov. 17 - west of Williams

~~open~~ pinyon-juniper open scrub forest with thin grass, some areas with *Pinus ponderosa* forest. A few inches of snow.

Between Williams and Flagstaff - open but more or less continuous stand of small pines 3-5 m. tall, with thin grass and with scattered taller pines, 20-25 m. tall. So much snow that it is hard to be sure if the small pines are *P. ponderosa*, but they probably are. The large ones are. This situation could arise from fire or from planned logging and management, or perhaps from former heavy grazing.

East of Flagstaff the pine forest is more varied, some open ground. Some areas of scattered pine with abundant seedlings - in a few years it will look much like that described above. Some uniform open <sup>pine</sup> forest areas 4-6 m. tall, no tall pines. Then pinyon-juniper open scrub forest over large areas. A few inches of snow everywhere.

## EL CAPITAN

Tr. 18, Eastbound, 39½ hrs. Los Angeles-Chicago  
Daily, All-Chair-Car Hi-Level Streamliner.  
Extra fare train.

Altitude	Mls.	Read Down	Altitude	Mls.	Read Down
13		Leave San Diego Train 79, 5.00 pm, arrive Los Angeles Union Station 7.35 pm.	4045	1235	Ar LA JUNTA..... Colo. 8.20PM
318	0	Lv LOS ANGELES..... Cal. 8.00PM	4045	1235	Lv LA JUNTA..... Colo. 8.25PM
35	2	Cross Los Angeles River. 8.05PM	1256		Cross Purgatoire River... 8.44PM
		Long Beach passengers for El Capitan leave at 7.00 p.m., via motor coach for Pasadena.	1269		Caddoa Dam..... 8.51PM
830	9	Lv PASADENA..... Cal. 8.30PM	3603	1288	Lv LAMAR..... Colo. 8.56PM
	21	Cross San Gabriel River. 8.52PM			Stops at Lamar to receive passengers for Kansas City and beyond or South of Newton and to discharge passengers from Albuquerque and beyond.
860	31	Lv POMONA..... Cal. 9.07PM	1310		Cross Arkansas River... 9.33PM
1077	60	Lv SAN BERNARDINO..... Cal. 9.37PM	1320		Cross Colo.-Kan. boundary 9.38PM
3822	87	Cajon Pass between San Bernardino and San Gabriel Mountains..... 10.11PM	2830	1387	Lv GARDEN CITY..... Kan. 10.24PM
	108	Cross Mojave River... 10.56PM			Stops at Garden City to receive passengers for Kansas City and beyond or South of Newton and to discharge passengers from Albuquerque and beyond.
2105	142	Lv BARSTOW..... Cal. 11.35PM			Ar DODGE CITY (MST) Kan. 11.15PM
476	308	Ar NEEDLES..... Cal. 2.07AM			At Dodge City turn watches AHEAD one hour.
476	308	Lv NEEDLES (PST)..... Cal. 2.17AM	2486	1437	Ar DODGE CITY (CST) Kan. 12.18AM
		Leaving Needles turn watches AHEAD one hour.			Cross Arkansas River... 12.50AM
320		Cross Colorado River, Calif.-Arizona boundary 3.25AM	2486	1437	Cross Arkansas River... 1.00AM
5242	457	Lv SELIGMAN (MST) Ariz. 6.11AM	1530	1558	Lv HUTCHINSON..... Kan. 1.53AM
6748	509	Lv WILLIAMS..... Ariz. 7.26AM			Stops at Hutchinson to receive passengers for Kansas and beyond or South of Newton and to discharge passengers from Albuquerque and beyond.
7313	536	Cross Arizona Divide... 7.50AM	1445	1591	Ar NEWTON..... Kan. 2.30AM
6902	567	Lv FLAGSTAFF..... Ariz. 8.06AM	1445	1591	Lv NEWTON..... Kan. 2.35AM
	574	Cross Canyon Diablo... 8.37AM	781	1776	Cross Kan.-Mo. boundary 3.41AM
4843	601	Lv WINSLOW..... Ariz. 9.05AM	781	1776	Ar KANSAS CITY..... Mo. 5.35AM
	604	Cross Little Colorado River 9.08AM	781	1776	Lv KANSAS CITY..... Mo. 5.50AM
707		Cross Ariz.-N.M. boundary 9.08AM	1802		Cross Missouri River... 6.28AM
6506	729	Lv GALLUP..... N.Mex. 10.52AM	1857		Cross Grand River... 7.19AM
7247	758	Cross Continental Divide 11.00AM	1903		Cross Chariton River... 7.33AM
	854	Cross Rio Puerco... 11.50PM	1947		Cross N. Pabian River... 8.18AM
	878	Cross Rio Grande... 1.00PM	1958		Cross Wyaconda River... 8.55AM
4934	889	Ar ALBUQUERQUE..... N.M. 1.15PM	1976		Cross Des Moines River 8.50AM
4934	889	Lv ALBUQUERQUE..... N.M. 1.25PM	521	1992	Lv SHOPTON..... Ia. 9.20AM
5457	956	Ar LAMY..... N.Mex. 2.30PM	523	1994	Lv FT. MADISON..... Ia. 9.25AM
986	974	For Santa Fe and Land of Pueblos take motor coach from Lamy 2.35 pm., arrive Santa Fe 3.10 pm.	1995		Cross Mississippi River... 9.27AM
		Leave Santa Fe 1.45 pm. via motor coach to connect with the El Capitan at Lamy.	755	2049	Lv GALESBURG..... Ill. 10.15AM
6457	956	Lv LAMY..... N.Mex. 2.30PM			Stops at Galesburg only to discharge passengers from Lamy, N. M. and scheduled stops Albuquerque and beyond.
	991	Cross Pecos River... 3.00PM	2063		Cross Spoon River... 10.30AM
1020		Cross Gallinas River... 4.05PM	515	2096	Ar CHILLICOTHE..... Ill. 11.00AM
6392	1021	Ar LAS VEGAS..... N.Mex. 4.05PM	2098		Cross Illinois River... 11.08AM
6392	1021	Lv LAS VEGAS..... N.Mex. 4.08PM	2135		Cross Vermilion River... 11.35AM
		Passing through Rocky Mountains—beautiful views of mountains.	625	2137	Lv STREATOR..... Ill. 11.40AM
6666	1131	Ar RATON..... N.Mex. 6.01PM	2174		Cross Kankakee River... 11.56PM
6666	1131	Lv RATON..... N.Mex. 6.04PM	549	2188	Lv JOLIET..... Ill. 12.30PM
7588	1138	Cross New Mexico-Colo. boundary through Raton Tunnel, one-half mile long and highest point on the Santa Fe. 6.25PM	2202		Cross Des Plaines River... 12.40PM
5971	1153	Lv TRINIDAD..... Colo. 7.01PM	2215		Cross Des Plaines River... 1.10PM
		Stops at Trinidad only to receive passengers for Kansas City and beyond or South of Newton and discharge passengers from Albuquerque and beyond.	593	2226	Ar CHICAGO (CST)..... Ill. 1.30PM

\*Stops to discharge passengers from scheduled stops Albuquerque, N. M. and beyond.

†Stops to discharge passengers from scheduled stops Los Angeles to Barstow; also to receive passengers for scheduled stops Albuquerque and beyond.

‡Stops to discharge passengers from Los Angeles; also to receive passengers for scheduled stops Kansas City and beyond.

☞ Indicates Rail-Auto Service available.

at plateau off and pinyon-juniper covering a half mile. The 2 m. tall south which bush noted where it

ed of the is a dwarf a steppe to 1 m. tall, n 0.5, some grades with bushes locally very red dwarf

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Nov. 17

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#### HERE'S HOW TO OPERATE YOUR CHAIR . . . .

**A** This trigger on arm controls back of seat. Pull up on trigger and push seat back to position desired. When seat is reclined pull up on trigger to bring back of seat forward.

**B** Legrest pulls up and can be set to position desired. Notice that when you pull legrest to a position higher than level of seat it will drop down.

By turning legrest completely upside down you can make a crib of seat for small child.

**C** Button at inside top of each seat permits you to adjust top part of seat to position you find most comfortable.

There is a center arm that folds into back of seat when not in use.

Reading lamp focused above each seat can be used as you desire.

We caution passengers not to stand or sit on leg rest of their seats as they will not support your weight and may cause injury.

**PILLOWS** are available from the news agent. He will be through the train to offer you a pillow, which can be purchased for 50c for your trip.

**DRESSING ROOMS AND LAVATORIES** are located on the lower level of each chair car. Also, there are lavatories on the upper level of the lounge car.

Out on open flat plateau between Flagstaff and Winslow the pinyon-juniper gets smaller, petering out shortly after half way to Winslow. Just before this, while the bushes are still 2 m. tall is a vast area south of the track in which every single bush has been uprooted and is lying where it fell.

East of the end of the pinyon juniper is a dwarf scrub-savanna steppe with bushes up to 1 m. tall, mostly less than 0.5, possibly bunches, some altiples (?). This grades into steppe with practically no bushes locally but mostly a very widely scattered dwarf scrub savanna.

Thin snow generally.

East of this an area of curious erosion remnants of wind rounded red sandstone seemingly lying at random on the slightly rolling steppe covered plateau.



Still east of this the steppe changes to a bunch-grass steppe with, locally, tufts of *Chrysanthamnus*, and another type of erosion, remnant low mesa-like, sparsely and unevenly distributed on the plateau. There, more dwarf scrub savanna.

Just east of Winslow are considerable areas of *Tamarix* scrub, mostly along a broad wash which now has water in it. The *Tamarix* has turned a burnt orange-brown in color. Around it on the rolling plateau is a mosaic of open scrub and steppe. Locally, small patches of scattered cottonwood mixed with the *Tamarix*.

This mosaic continues eastward, along the river to Holbrook, and beyond.

Locally *Tamarix* replaced along river by small *Populus*.

East of Holbrook scattered small sandstone mesas and buttes.

Farther east an area

of small dunes, with various measures taken to stabilize them along tracks, including shrub plantings.

Mesas more conspicuous.

Thin snow generally, all morning.

Eastward large areas of scrub savanna and dwarf scrub savanna, on rolling and slightly dissected plateau country.

At about Arizona-New Mexico boundary the prevailing vegetation changes to an open forest or savanna of piñon-juniper.

Shortly before Gallup a line of west-facing red cliffs, locally cut into beautiful narrow domes and pillars. Almost bare of vegetation.

Toward Gallup the route follows a wide canyon cut in a sandstone plateau. Scrub savanna in bottom, scattered pines *ponderosa* in open piñon-juniper on top.



East of Gallup, to north of route very interesting erosion features in red sandstone. Prevailing vegetation open scrub in valley bottoms, open scrub forest or savanna of piñon-juniper on mesas and ridges.

Still thin snow over everything.

Piñon-juniper continues for a long distance eastward, but after erosion features are passed it alternates with large flat or gently rolling steppe.

Snow disappears from all except high slopes near Grants.

Lava beds with open scrub, mostly *Atriplex*, east of Grants, in broad valley cut in flat-lying sandstone beds. These have piñon-juniper.

Snow again eastward.

West of Rio Puerco are vast plains to south of track, almost shrubless steppe. To north of track low rolling land, steppe with scattered juniper shrubs. Very little snow.

Tamarisk common along watercourses.

This steppe changes eastward to an open dwarf scrub which covers large areas of rolling plain around and northeast of Gallup. Principal shrub seems to be *Artemisia* (cf. *filifolia*?) and possibly *Trametes* sp.

(possibly seed *Artemisia*?) Snow is gone from here. Scattered small *Quercus* appears northward.

Some rather old lava beds on northwest side at a distance. A few juniper locally.

A dwarf scrub of varying proportions of *Artemisia*, *Atriplex*, and *Senecio* *riddellii* (?) dominates the plain east of the Rio Grande below Albuquerque. The low ground along the river has open *Populus* forest. The leaves of the cottonwoods vary from bright gold to dull buff, and from many trees they have fallen. A dull red note is added by what are probably pods of a tree that I fail to identify from a distance. It has small, narrow silvery hanging leaves, also.

2.



Bottom lands above Albuquerque are largely cultivated, checked with high levees and irrigated. *Populus* forest near river. Scattered trees near roads and houses elsewhere.

Thin snow, melted off in places.

Soil fine, gray brown, gullied somewhat away from river.

Slopes at foot of terrace scarp very gentle, upper parts with open *Atriplex* scrub.

Nov. 19 - Flight from Santa Fe to Clovis, N. M. 12000', rt. side of plane.

Mainly plateau country, the first part covered largely by open forest, probably pine, or perhaps some piñon-juniper. No closed forest at all. Areas of very flat ground are bare or grassy.

Eastward this forest becomes sparser, areas of grass become larger and more prevalent.

Erosional features are

interesting. Small remnants of mesa, amoeboid in shape, some skeletonized by headward erosion. This headward erosion is really a rather obvious process, as the cutting power of the water would be proportional to the slope down which it flowed. This can be applied to explain many erosional features. Perhaps there is a limit of steepness beyond which the cutting power lessens.

Toward Clovis the grassland becomes the prevalent feature and trees become more and more restricted to escarpments and the gentle slopes just above them. Near Clovis trees disappear altogether. Small ponds, probably dry during most of the year, are scattered rather abundantly over these plains.

The topography also becomes rapidly less rugged and near Clovis there is almost no relief.



Nov. 19 ~~has~~ Flight from  
Clovis N. M. to Fort  
Worth, Texas. st. side of plane.

East of Clovis are  
large areas of low  
partially or entirely  
stabilized dunes. This  
country, where not  
under cultivation, seems  
covered by a low very  
thin brush.

In some of the more obvious  
of these areas the dunes  
are well stabilized except  
for localized spots of  
activity, which show  
up very strikingly.  
Low spots where water  
collects have trails  
radiating out from them.  
Here also there is a bit of  
~~and~~ wind erosion getting  
started.

Through this country,  
both in the dunes and  
elsewhere, low spots are  
common, without outlets.  
Most of them do not  
have any water in them.  
Seems quite likely that  
either gypsum deposition,  
silting or compaction  
by alternate cracking and  
swelling could make

the bottoms of such pools  
very much more  
resistant to erosion  
than the surrounding  
area, if the whole region  
were subjected to rejuven-  
ation.

Eastward cultivation  
becomes more and more  
prevalent. Some of  
the more well developed  
of these pools should  
be studied. They are  
especially striking  
just west of Lubbock, Texas,  
and <sup>some</sup> do not seem to have  
been completely altered.

There are also some, not so  
well preserved, east of  
the city. Most of them  
have been plowed south-  
east and east the rivers  
and its tributaries  
have cut broad ravines,  
with vertical sides,  
showing that rejuvena-  
tion had already started.

East of here the gullying  
becomes much more prevalent.  
The soil changes to a  
red color and for almost  
the entire distance to Abilene,  
following the northern of two  
apparently dry rivers, is a



wilderness of thin brush and intricate dendritic gully systems. In the center of this is a ragged rocky knob. It would be of interest to examine this area floristically and to compare it with the grassland that may have existed here before the gullying took place. It would be important to figure out the sources of the present flora and to compare its explosive expansion with the contraction of the prairie flora that it replaced. Also it should be of interest to find if any components were equally at home under both of these contrasting sets of conditions. The brush seems to be mesquite, rather closely spaced but not touching in most places, mostly almost bare at this season.

East of Abilene the country becomes more heavily wooded, but probably

still with mesquite, though it is hard to tell from a high altitude. Ponds become abundant but are mostly artificial.

The country for a long way eastward from Abilene is a much dissected plain, with much of the flat portion under cultivation, most of the irregular area loosely wooded or in grass with scattered trees and bushes. The total relief is not much and the erosion remnants are flat-topped.

Eastward the trees change from deciduous to very dark green evergreens. Cultivation becomes less and less common. Cattle trails are common. Areas of active erosion are common and of fair size.

Eastward a fairly large meandering river crossed diagonally. The bluffs and mesas lining its meanders are covered by open evergreen forest.

This and deciduous area east of it probably the East Cross Timbers.



1958 Texas - Maryland  
Nov. 20 - flight Ft. Worth to Wash.

southeast of Ft. Worth  
and southwest of Dallas(?)  
large areas that seem  
to be plowed up in gigantic  
furrows as with a  
gold dredger. What is this?

Thinness says best  
time to visit Texas is of  
Dallas is April or August.

East of Dallas - large  
areas of black soil -  
intensively cultivated.  
Are these "black cotton soils"?  
Deciduous trees along  
some ravines.

Dec. 7 - flight Washington - New York

9:15 a.m. left side of plane 7:45

Along N. 20 of Washington  
a highway parallel with  
it - many patches of  
pine woods. Pine abundant  
both as substantial angular  
patches and as small  
groves scattered in the  
deciduous woods.

Northeast of Baltimore  
toward Harborside  
there is no pine. There is  
a substantial part of  
the total area is wooded.  
A few pine patches, all  
angular with same

pattern as nearby cleared  
fields, then very little  
more. Streams noticeably  
entrenched, at least larger  
ones, between Harborside  
and Philadelphia.

Practically no pine  
to Philadelphia and in  
New Jersey between Phila. and  
New York.

Flight - Idlewild Airport, Long Island  
to Prestwich, Scotland - 1:45 p.m.  
Left side of plane.

An enormous area, east  
of Idlewild, covered by suburban  
developments with small houses.  
Extensive area of salt-marsh  
inside ~~on~~ a long, narrow bar  
island with a steep outer  
continuous dune slope and  
narrow beach. The salt  
marshes are apparently  
developed on white sand and  
have mostly been closely  
ditched with parallel  
ditches, exposing the sand.  
Course takes in out to sea  
rather soon, so we miss  
most of Long Island.

Then turned back northward  
over Long Island, then east  
along its south side.  
There are still considerable



areas of wood and swamp eastward, but very numerous subdivisions some salt marsh along estuaries. Forest seems to be a varying mixture of deciduous trees and pine. In the eastern part is a typical drowned coast line with many V-shaped estuaries, offshore sand islands, bar islands, etc. The forest is in general much cut by roads, usually in a rectangular pattern. The ~~off~~ long-shore bar island on the east has an astonishingly straight and sharply cut outer coast and a rather wide beach.

The inner coast is very irregular and the sound is filled with patches of marsh and shifting sand islands and bars. The island gradually joins the mainland as the sound pinches out.

Less development out on the long peninsula to Montauk Pt. but there is some. East of here broken

cumulus clouds below with particularly ragged appearance on top, like shredded cotton batting. A rather dirty gray appearance. No high clouds close by, but to north a vague alto-stratus layer. Irregular coastline in distance, details not clear because of cloud patches.

Martha's Vineyard mostly obscured. A curious large lagoon on northeast corner, surrounded by a semicircular bar. (or is this Martha's Vineyard?)

Nantucket (?) fairly large, much open beach (?) land and woods. An astonishing curved bar on inner side with a cusped coast.

Wooded dunes (?) on east side and a large lagoon. Wave cut cliff on southeast corner.

Cape Cod to north, not very clear.

Out to sea the cloud layer becomes continuous, more or less level on top but with a cotton batting-like roughness and at more or less regular intervals, rounded hummocks rising above this surface which have a slight indefinite inverted vortex or swirl appearance, this not at all regular.



Dec. 8 Flight Copenhagen-Dusseldorf  
Soils around Copenhagen  
airport very black, mostly  
plowed, some with green grass.  
Low cloud layer cuts off visibility.

Just before Hamburg a small  
cloud-free area - intensively  
cultivated and green.  
Several small forest patches -  
one very curious - looks  
like an old lakebed, solidly  
wooded, surrounded by  
a bare beach.

After Hamburg continuous  
low beds of clouds - flat-topped  
cumulus with closed fissures  
or "sutures" between them. About  
half or a third of the way we  
crossed a curious rather  
sharp boundary, curving  
somewhat (between white  
firm-looking clouds on one  
side and less substantial  
gray ones on the other (toward Dusseldorf)).

Around Dusseldorf brownish gray  
soils, mostly cultivated, little  
green to be seen except some  
patches of conifer woods, a  
little thin grass. Some  
fair sized areas of woods  
~~all~~ either pure deciduous  
or pure conifer.

Dusseldorf to Geneva -

Rhin meanders above Dusseldorf.  
Thin layer of structureless  
stratus cloud, semi-transparent  
with several large cumuli  
protruding up through it,  
locally abundant  
small cumuli. Visibility  
generally poor.

North of the foothills of the  
~~Vogesen~~ <sup>Vogesen</sup> a wide unenclosed plain.  
~~Shapely~~ dissected by occasional  
entrenched streams. Intensely  
cultivated except for a few  
patches of coniferous forest.  
These more abundant and larger  
near the mountains, also  
the meandering streams  
more deeply entrenched and  
conifer forest on some of the  
ravine walls. In the  
cultivated areas not a  
hedgerow nor a tree nor a  
square foot of waste ground.  
The plots long and narrow.  
Foothills of ~~Vogesen~~ <sup>Vogesen</sup> about 75%  
in conifer woods, 25% cultivated  
in grain(?) This mostly in  
small valleys, the ridge  
between them wooded. Some  
cleared plots even high on slopes.  
Toward south side of Vogesen the  
proportion of cultivation is much  
greater. Around ~~base of~~ base of



Vosges and to summits of Jura a thin dirty looking semi-transparent fog with mountain stretching up through it. South of summit ridge of Jura and in its higher valleys a bed of dense clouds.

Tops of Jura dusted with snow, west of Zurich.

Snow more plentiful on north side of mountains.

Portion of Jura showing above clouds between Zurich and Geneva largely <sup>coniferous</sup> wooded, but some clearings or meadows on tops, some bare gray cliffs of magnificent size.

In the valley about half way from Zurich to Geneva a small area of woods, mostly conifers but part deciduous, is covered by ice. Other similar areas not. This east of Rhine! High Alps to south mostly snow-covered.

No snow on western Jura, at least not visible from south. Toward Geneva ice on trees on wooded hill in valley bottom, even on those on flat ground. Just a little snow dusted over ground to south of woods

fohar

The high Jura near Geneva have extensive meadowland on their summits and upper slopes. <sup>very little</sup> snow on south side, at least.

Around Geneva fields are slightly green, some quite so.

From a high altitude 6-7 main ranges of the Jura are visible parallel, broken by the gaps of the Rhone Valley.

All except the steepest land between Geneva and the higher Alps is cultivated or pastured. Steep slopes wooded. Some hill tops powdered with snow. Passed Mont Blanc, protruding above the clouds, completely white. Another peak, almost as high just south of it.

Southern part of Alps exposed, great snow fields, only cliffs free of snow.

Italian slopes with rather little snow, thinly wooded in most parts. Visibility poor.

Dec 11 Beirut to Karachi mostly at night. 12,000' right side of plane, crossed peninsula of Trucial Oman at a point north of ~~S~~ohar.

The west side is a vast



plain of oriented dunes, with <sup>small</sup> patches of *Phoenix arabica* between them here and there, especially inland. No other vegetation seen on the otherwise pale tawny plain. Well inland are extremely rugged nude mountains, a dull pale chocolate brown in color. In a deep valley <sup>in the Persian Gulf drainage</sup> is a fair sized oasis with *Phoenix dactylifera*. In the deep canyons on the east side water can be seen occasionally, with a few small oases. In some of the steep ravines a bit of gray-green vegetation can be seen. Nothing on ridges or slopes. The coastal plain on this side is narrow, but there is a small oasis with a small town, very bleak-looking. This might be taken but looks very small. Complicated series of coral & paddocks near but not in oasis. Oasis has other plants as well as *Phoenix*, but can't make out what they are. Few or no *Phoenix arabica* on this side of mountains.

A little out from the east coast are lines of a tawny bloom festooning the coast.

The coast of Iran near Chabar, seen from a short distance out at sea, is indescribably barren. It is a dull cream color, like coral sand, rather flat with almost no vegetation. Two small oases on the peninsula east of the bay where Chabar is located. Chabar occupies one of them. The low mountains back of the coast look just as barren as the coast.

Eastward are low abrupt bare hills or cliffs very near the coast.

The mouth of the Dashti River is one of a cluster of stream mouths on the bay west of Ras Jiwani. The country is utterly desolate, but must have had rain just recently, as the streams have water and each has a plume of silt in the sea outside its mouth.

The peninsula east of and culminating in Ras Jiwani has low rugged hills and conspicuous cliffs back of a narrow, tawny, completely barren flat coastal plain.



This seems to be a cusped coast, the cusps very prominent looking eastward, but somewhat elevated and the tips may be truncate.

Karachi - tidal flats west of <sup>small</sup> river mouth on cusp have apparently a low semi-open mangrove scrub on more stable patches, bare mud on other parts. Same east of river but above the mouth, bushes here mostly low gray ones, some taller green ones. Tidal flats on coast to east mostly bare.

Flat desert east of Karachi with irregularly scattered dark gray green small trees or large bushes and more abundant smaller gray bushes.

Enormous expanses of mostly vegetated tidal flats extending south in the Indus delta.

*Calotropis* common locally n.e. of airport. *Capparis*? very common.

Areas of thin low dry grass around airport.

Irrigated fields bright green.

At Karachi airport is a form of *Pseudanthemum*

another with wide ovate leaves dark purplish green above, deep purple beneath, flowers white, dotted with purple around throat, two upper lobes contiguous and somewhat overlapping, lateral spreading, lower narrower and somewhat bent forward (subgibbous). Another with gray-green, gray and white variegated leaves. Buds only.

The ordinary form of *Physcia guilfoylei*, ~~above~~ with white bordered leaves. Also a non-variegated form which looks as I remember *P. pinnata* to look. Perhaps *P. guilfoylei* is only a form of *P. pinnata*. All sterile.

Between Karachi and the airport is a profoundly disturbed landscape. Cattle trails innumerable.

### Karachi - Calcutta

Phoenix and other trees around irrigated areas. Indus delta extends south as far as vision permits on such a hazy day. Is this dwarf mangrove vegetation??

Conspicuous dendritic gully systems northwest of Indus delta in desert. Most shrubs have ever seen



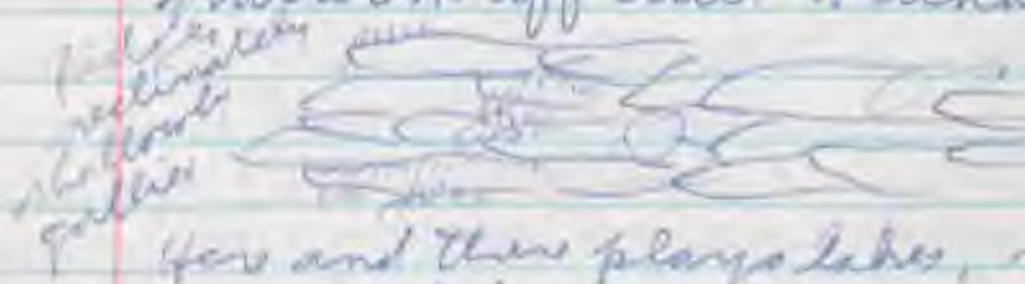
Upper part of delta seems to lack ~~in~~ vegetation almost completely. Salt pans.

Northwest of Indus is a desert landscape, locally completely bare, locally dominated by shrubs and (?) small trees. Large square reservoir of greenish black water, irrigated lands to east of it, but some areas appear alkaline.

Channels and bottom-land of Indus - bottom-land mostly wooded, some grassland and savanna. Great sand flats along channel itself. East of channel alternating cultivation and woody vegetation. Some areas appear to be sand and support a sparse vegetation. This mosaic continues for some distance. The cultivated land, cut up into small irregularly rectangular plots by levees, becoming more and more dominant eastward to another meandering channel.

House-plots in eastern part with same pattern east of the channel for a short distance, then open desert with varying concentration of bushes, locally now, locally small irrigated areas.

Gulf of Cutch lined with irrigated land. Some low wetish spots away from it also irrigated. Some areas apparently too alkaline and marshy for agriculture. All have evidently been at one time or another under cultivation judging from levees and ditches. Some areas are very black, have irregular patches of vegetation, but look like dried marshes. Vast old dried river meanders with intricate patterns. The actual channels mostly vegetated, crescent shaped areas between them with varied density of natural vegetation. All of this north of the Gulf of Cutch. Eastward a somewhat elevated series of broken parallel ridges running N.E. - S.W. - obviously a dissected plain but the pattern difficult to understand.



Here and there plays lakes, now dry and bare, surrounded by scattered trees. General vegetation of area scattered bushes. Scattered bottom areas



appear to be or to have been cultivated. This extends a long way, perfectly oriented, little variation. Southward of it is an extension of the Gulf of Cutch, mostly vast pale sand flats, water in center.

Northward of this are vast brownish gray flats almost a quite bare of vegetation. In places there have tracks across them, not quite extending to edge of flats. Small fans of alluvial material extend out onto these flats from ravine mouths. North of eastward extension of this is flat land divided into plots by mud or stone walls, probably cultivated during wet season. This surrounding a massive deeply jointed low mountain of reddish granite. The joint pattern east-west, sparse bushy desert vegetation.

Another much lower mass of this eastward. East of this more "cultivated" land and a small village. Then more of the extension of absolutely bare playa flats, surrounding a muddy lake with salty margins. Hard even to be sure that this lake has water in it.

East of this vast stretch of desolate mostly gray-brown cultivated land, cut into plots by walls with some trees or bushes. Dwellings concentrated in dense villages and towns scattered through this area, each surrounded by a tract of overgrazed pasture land. Going to work in the fields must take a very considerable amount of time. To the south there are some wet spots in this pattern, visible when the low sun hits them.

This landscape becomes slightly greener eastward and seems to develop a slight rolling relief the axes of the undulations north-south. Trees more abundant here in the pasture areas, none in the cultivated areas except on the walls between plots and very few there.

River, probably that running through Almadah. The scarps of its ravine badly gullied. Eastward same pattern of cultivated fields with walls,



scattered villages each with a pasture area, this more wooded than farther west. Landscape greener but still only with a tinge of green. All of this a plain with very little relief.

Low undulating <sup>almost</sup> winding ridges, trending southeast, parallel, become noticeable eastward, probably stabilized dune ridges.

Then patches of rocky hills outcropping from the plain, with flat valleys between them. Hills semi wooded more or less green. Valleys cultivated, with sandy river channels, streams dry.

stream and

Hills more numerous, valleys narrower, everything greener eastward.

Probably the north-south axis of the Vindhya Range.

From here the country is generally <sup>increasingly</sup> rough, with uneven open woods. Trend of ridges north-south or somewhat north-south.

Mts. become more densely wooded, ridges stronger, reddish, sedimentary, habitation and cultivation only in main valleys, roads almost absent. Practically no flat land.

Many lakes or reservoirs seen, especially in distance to south, a few along course.

Trend of ridges changes to N.W.-S.E. becomes a bit less rugged, much less wooded. An important stream or river winding southeastward and much flat cultivated land along it. Hills almost disappear. Perhaps the Narbada R. when it turns near Jabalpur.

Hills still along course but plains along river to south. Must be Narbada, as it parallels course for some distance to south. Lakes common in its plain.

Fog getting bad, toward sunset, visibility poor.

Vegetation poorer eastward, probably because of overgrazing rather than climate.

Hills disappear along course and to south. Away from rivers country seems sparsely settled but still very poorly vegetated.

Then some scattered low hills with thin woods.

Country gradually hilly again but only in patches or belts trending north-south, rather hilly.



Cultivation increases eastward to south branch of Lon River. After this too dark for visibility.

Dec. 10 - Bangkok to Djakarta

Northeast coast of Malaya - Mouth of a large meandering river with meander patterns throughout coastal plain.

Largely a mosaic of rubber plantations, coconut plantations and areas of paddy fields some forest patches. About half of ~~general~~ area back from coast is in rice, in various stages from green to brown.

Farther inland a large area of rice that is mostly green. Also some inundated land and swamp.

Then mountains which are densely forested. Many clouds, visibility poor.

Crossed another broad valley with a river running northeast, with considerable rice, some rubber (?), some swamp forest.

Then hills with dense forest. From here on mostly cloudy. But occasional holes showing hills and mountains all thickly wooded, ~~most~~

numerous streams.

After a considerable distance another river running east of northeast, with a reddish sandy bed, some rice in the narrow valley bottom. Then forested hills. Very cloudy. Then less clouds, a relief of small hills, very intricate, solid uniform rain forest. This over a large area.

After a considerable distance a large meandering river and valley system running southeast, much rubber and rice in the broad flat bottom. This enters the sea with another coming from the west, and there are large swamps areas near the mouth.

Along the coast a spectacular series of beach ridges and an old shore line, of white sand back of a cultivated area.

Another meandering river of black water, and several black water lagoon and inlets in this cultivated strip.

Coastal plain with white sand and series of old sand ridges, a large muddy



estuary a lagoon. Then much swamp, long shore channels, some open grassland sandy beach. Coast trends slightly more westward. The sea here is very muddy and of a greenish pea-soup color. A broad complicated coastal plain all along here but visibility poor. The green color of the sea is more and more conspicuous, almost a grass green. I have never seen anything like this. Extends a long distance from shore, water obviously very shallow. Bottom visible as great parallel ridges or undulations. Could this be turtle grass? Fills the whole sight of the southern east coast!

Another large river estuary with very complicated channels paralleling coast. Approaching shore again, very muddy. Another large river mouth, extremely muddy. Much rice in its valley. South of it a large lake with many islands of swamp forest.

Low high island offshore appears grassy or covered by low scrub except for trees around

shore. Much cultivated land and a settlement on coastal plain. Vast forest on flat to rolling a low hilly ground inland. A road cutting through the forest, running about north northwest.

Southward many clearings in the forest, mostly grassy. Some clearing in progress.

Then much rubber land with swamps along streams. Rubber very green at this season.

One area of hedge style planting of rubber. Many clearings. Soil where exposed seems to be a white sand, at least in many places.

Then large hilly forested area, extending unbroken for a vast distance. Relief rather slight.

Then many clearings with lalang. Large valley almost all more or less cleared and in belukar and many young rubber plantations.

The coast again, with a large river running into it, some clearing in this valley. More old beach ridges around a crescent shaped bay water



pea green. Along south part of bay forest comes almost to beach. Black water streamers coming out of it into middle bay. Mixing conspicuous.

Plane made right angle turn westward over flat forest land with some old clearings. Forest becomes very fine-textured as we approach a great lagoon or estuary. Plantations immediately around estuary, with roads.

Considerable mangrove swamps.

Approaching Johore Strait and Singapore Island. Complicated pattern of rubber plantation, belukar, grass, forest, swamp between estuary and strait. Much new rubber plantation.

Singapore Island - mostly mixture of houses and trees, great red scars. Water reserve forest, some small rubber plantations.

Turned south again. Large islands to west cut by straits, mostly low and wooded.

Southward a maze of islands - tiny ones ten

be grassy with trees along shore. Larger ones wooded but with degraded forest a belukar and much savanna.

Mangrove swamps along with some plantations and new clearings. Channels and estuaries very complicated.

Relief low. Obviously a drowned low hilly relief.

Southward the islets become smaller and sparser, surrounded by dark colored reefs.

Sumatra in distance to west, a peninsula extending east and southeast.

About opposite this another group of small islands. Unbroken forest, partly cleared at some time, more or less regrown, partly rather open. Some plantation(?), no brick habitations.

Bangka and satellite islands sea very green in vicinity. Islands largely wooded but with many clearings,alang, savanna, belukar, in an irregular mosaic. Mountainous central and southern part still has some undisturbed forest. Apparently some small



tin umbungas south side.  
Large burned areas on  
south coast.

A large roughly circular  
area of sea is a dull dirty  
green color, in contrast to  
the blue-green around it.  
Bounded by a scalloped  
line of white-foam breakers?  
not at all clear what  
this is from 15000'. Some  
patches of bloom south of the  
Sumatra in distance.

The above dull green  
water evidently merely  
a different water mass.  
Here are three of different  
colors intersecting, not  
mixing readily. But  
these not outlined in white.  
More grass-green sea,  
becoming lighter and more  
pea-green southward. These  
greens are probably merely  
due to different depths of  
water, but have a duller,  
more opaque appearance  
than I am accustomed to.  
Possibly because of greater  
silt content or plankton content.

Large island, mostly obscured  
by clouds, partly cleared, some  
roads, plantations.

Approaching south Sumatra

Sea very muddy. Coast low.  
Almost entire island under clouds.  
Glimpses of interior show  
dense forest. Some cleared  
land along a small stream,  
several houses, ~~and~~ clearings  
bright green, perhaps balau,  
possibly rice but no levee pattern.  
Some paths visible. Then  
more forest, vast areas.  
Little or no relief. Mostly cloudy.  
Forest very mixed, some trees  
lighter colored. Then a large  
area of smooth canopy  
with only few scattered  
emergents, then emergents  
become abundant, then  
close to form canopy. A few  
trees bare, a few in young  
leaf.

Some large rounded clear  
spots, bright green, near a  
black meandering stream.  
Some black areas in green  
suggest that clearings may  
be marsh. Lower along  
this stream, southward, are  
obviously man-made clearings  
in various stages of regrowth.  
Also the forest becomes  
more open. Some patches of  
savanna. But grass very green.  
Further <sup>east</sup> of island low, wooded  
the local very light colored trees.



Rice fields around  
Djoharta airport have  
villages with cocos,  
Musa, Artocarpus, etc.  
Till roofed houses. Village  
like wooded islands  
in green rice.



Dec. 9 - Karachi airport

J 39651

*Pseuderanthemum*

planted around airport building

shrub 1 m. tall. leaves dark green above, deep purple beneath; flowers white with purple dots around throat. Two upper lobes erect, partly overlapping, lateral lobes spreading, lower lobe bent forward somewhat gibbous.



Dec. 16 - Between Tjiawi  
and Tugur

Tenaced rice, with  
bamboo, bananas, <sup>fruit</sup> mango,  
other tree crops, much  
Manihot, Carica, etc. The  
rice in all stages from  
planting to harvest. Replanted  
immediately. Many ornamentals.

sweet  
potatoes

Some Cyathea and other  
wild plants on ravine walls.  
Above Tugur same pattern  
along roads. Tea planta-  
tions on slopes. Little shade.

Dark brown soil, 1-2 m.  
deep.

Tea height 1-1.5 m.

Forest on top of some  
hills.

Rice + village complex drops  
out very soon after Tugur.

Plantjak Pass - 6 photos (K) -  
tea plantations with very  
little shade. Some with a  
gray appearance because they  
are trimmed back very drastically.

On other side of pass the  
tea drops out soon and is  
replaced by rice, Manihot  
& garden complex.

## Tjibodas

From 4500' up a lower  
montane rain forest -  
trees widely spaced,  
canopy irregular  
and rather open,  
emergents to at least 40 m.

Altingia, <sup>small</sup> Castanopsis,  
Dioscorea

No noticeable stratification bet. shrub layer  
Asplenium nidus and  
other epiphytes common,  
thin but continuous  
moss cover.

Undergrowth layer to 4-5 m.  
Pinanga kuhlii, Calamus,  
Plectocomia, - very irregular

Dense ground layer of  
ferns and various herbs.  
rocks mossy.

Photos 5 show. 3 shot. at 4850'.

At 5000' large Podocarpus  
imbricaria come in as  
emergents.

Persea ~~lanceolata~~ rimosa

Throughout this forest  
lianas are present but  
not in great abundance.

at 5500' 5 photos + 1 w.

Here tallest tree perhaps 30-35 m.



Just below waterfall  
is an area where the forest  
has been destroyed by ~~the~~ a  
~~lava~~ mud flow  
during an eruption  
2 years ago. A few scrubby  
trees ~~survived~~ survived,  
but most are dead.

In one place where a section  
of this mudflow is exposed  
it is about a meter thick  
and looks like glacial till.

Shrubby vegetation has  
come in sparsely, including  
*Vaccinium*, *Leptospermum*,  
etc.. *Nertera* is common.  
*Nepenthes* seen. Low  
cane, apparently *Saccharum*,  
though the branchlets  
do not disarticulate  
properly.



not checked  
labels typed

Dec. 16 - Above Tjibodas,  
in rather open lower montane  
rain forest

~~29652 *Nephrolepis* abundant on tree trunks~~

39652 *Nephrolepis*  
abundant on tree trunks

53 *Podocarpus imbricata* Bl.  
common

54 *Drymaria*  
occasional along trail in

55 (few)  
common on tree trunks

56 *Usnea*  
common on twigs of emergent trees

57 *Ophioglossum*  
very local between rocks of trail

58 *Rasianthus*  
occasional in undergrowth  
along trail

59 (clasti.)  
rare along trail

60 *Nertera granadensis* (L.f.) Druce  
rare on mossy rocks

61 *Ophiorhiza*  
common on stones along trail

62 *Ophiorhiza*  
rare along trail

Dec. 16 Below Tjibodas Waterfall  
in open almost ~~completely~~  
~~destroyed~~ <sup>destroyed</sup> lower montane  
forest almost completely  
destroyed by mud-flow  
2 years ago, very open

for rhizome closely appressed  
to tree trunk, fronds pendent.  
very tall emergent tree  
(twigs picked up from ground)

(picked from ground)

semi-scandent shrub  
3-4 m. long.

small tree or large shrub,  
fruit black when ripe.  
prostrate, flowers  
yellow-green, fruit  
translucent vermilion.  
stem green, flowers white.  
stem purple

5500'

1692 m



labels tipped

39663 Polypodium  
common, terrestrial, in open.

41 64 Pratia montana  
occasional, in low bushes

42 65 Saccharum?  
common on open stony  
ground below falls

~~66 Nertera~~

42 66 Nertera granadensis (L.f.) Druce  
common on rocks and  
fallen tree trunks, in open.

41 67 Parmelia  
common on ground in open.

42 68 Davallia  
occasional on fallen  
logs in open

1692 m

scrambling, flowers  
purplish blue  
caespitose, irregularly  
ascending, upper  
blades on flowering  
culms reduced.

prostrate, firm,  
flowers greenish yellow,  
fruit translucent  
vermillion.

bright green above,  
white beneath.

very coriaceous.



Dec. 18 - Trip Bogor to  
Udjung Kulon by bus + boat.  
Around Bogor is a pattern  
of dryland garden cultivation  
and terraced rice.

Lower down, toward Djakarta  
on flatter ground, are some  
small rubber plantations  
and even some pasture, but  
still mainly gardens and  
rice.

In the gardens are

Cocos, Musa, Citrus,  
jack fruit, bamboo, manihot,  
mango, peanut, sweet potato,  
Cela, Piper batle, guava tree,  
Carica, Phoenix dactylifera (1),  
tamarind, Muntingia, Anacardium  
sugar cane

Ornamentals:

Acalypha amontacea.

Alacasia macrorrhiza

Jatropha curcas

Carpa hybr. Coleus sp.

Delonix regia

Caesalpinia pulcherrima

Dieffenbachia maculata

Catharanthus

Thevetia peruviana

Sporoxa erecta

Lambucus sp.

Hibiscus tiliaceus

Glinicidia repum

Allamanda hendersonii

Codiaeum variegatum

Leucaena glauca

Zephyranthes rosea

Zephyranthes candida

Thunbergia erecta

Toxocarpus montana coronaria

Hibiscus hybrid.

Merium oleander

Filicium?

Lamanea savan

Casuarina

Bougainvillea sp.

Pedilanthus tithymaloides

Erythrocylon cca

Clerodendrum thomsonii

Averrhoa bilimbi

Gerbera jamesonii

Tagetes

Solidago sp.

Malvaviscus

Cupressus sp.

Plumeria obtusa

Plumeria rubra

Caladium bicolor

Polycia scutellaria

Scindapsus aureus

Euphorbia sp.

Chrysanthemum latens

Hymenocallis littoralis

Hibiscus schizopetalus

Pisonia alba

Oreocarya repens

Antigonon leptopus

Polycia guilfoylei

Passiflora guianensis



street trees in Djakarta

*Mangifera indica*

*Delonix regia*

*Artocarpus heterophyllus*

*Rospterea regia*

*Ficus benjamina*

*Muntingia calabura*

*Thonelia peruviana*

*Tamarindus indica*

*Thuja* sp.

*Agathis* sp.

*Casuarina* sp.

along canal west of Djakarta

*Ipomoea erecta* very common

*Jatropha gossypifolia* occasional

(widely spread in Java, acc. Kostermans)

*Sesbania grandiflora* var.

(fl. eaten, acc. Kostermans)

Pangrangan - enormous market.

~~westward~~ - along road

*Sweetenia macrophylla*

*Cassia siamea*

*Cocos nucifera*

*Herca brasiliensis* (small plantations)

*Pantana camara* and  
*Ananas comosus* common  
in hedgerows.

*Metroxylon* swamps.

*Hibiscus macrophyllus*

Rice is cult. here but  
adverse

by no means as abundantly  
as in most places we  
have seen. Cassava  
and pasture and villages  
share ground with rice.  
Then some large open  
areas of rice.

Streams very muddy.

Some rather rolling open  
area. Apparently poor  
soils. Large uncultivated  
areas, with low scrub  
some parts in rice and  
rubber.

Scrub of *Melastoma*,  
*Fagraea*, *Lantana*, etc.

Then almost solid rice,  
some *Metroxylon* swamps.

Leaves used for thatch,  
trunks very little used for  
starch (acc. Kostermans).

Trunks reach 4 m.

Soils here (planosols?)  
light gray when dry,  
darker brownish gray when  
wet.

Throughout this part  
of Java the rice is headed  
and the bouquets of  
panicles are dried in the  
roadside.



Serang - much more open,  
less crowded than the  
west. Large to medium trees.  
Turn southward. Coconuts  
abundant. Mangoes + Achras.  
Some areas of *Imperata*.  
Thickets with *Gleichnia*.

### Pandeglang

Volcano to right - still has  
some patches of forest  
on higher and rougher parts.  
Parts of slopes grassy  
with only scattered trees.  
Turn westward.

### Garden complex.

*Gnetum gnemon* very common,  
small trees with narrow  
crowns.

The typical complex of  
trees, gardens, houses, etc.  
from Bojonegara to Djakarta  
and to Pandeglang is  
dominated by mango  
jakk-fruit and coconut.

At Pandeglang it changes  
and is a complex of coconut,  
Achras and *Gnetum*.

This is the pattern to Labuan  
where *Croton* becomes  
dominant and along the  
coast forms a pure stand  
(photos).

Mts. north of Labuan  
are cleared up to half  
or  $\frac{2}{3}$  of the way to top,  
secondary forest for the  
rest of the way.

A small island  
s. of Labuan seems  
to have relatively undis-  
turbed forest.

Krakatau can be seen  
to the n.w. rather too far  
to distinguish surface  
features. Ana Krakatau  
is a perfect cone, about  
like Alamagan. Three bits  
of Old Krakatau to right. Some  
explosive activity from the  
sea (?) to right of base of  
Ana K. columnar bursts  
either white or black, every  
few minutes, rising higher  
than Ana K.

Another double cone m. to  
the right, is not part  
of Krakatau group.

Coast of Java, to left,  
fringed by low islands,  
these appearing practically  
undisturbed.



Dec. 19 - Pulau Pentjeng island  
off shore of Ujung Kulon, west extremity  
of Java.

Inner beach has a  
fringe of *Sophora tomentosa*  
to 3 (4) m. tall, as placed  
here and there by *Vitex* sp.  
and with a little *Scaevola*.  
This fringe is backed  
by a wall of *Calophyllum*  
*inophyllum*, with  
occasional *Hernandia*, etc.  
*Tournefortia* rare in the  
fringe. The *Calophyllum*  
wall is several trees  
wide. Inside this is a  
belt of *Ficus* and other  
species. Then a wide  
mixed forest.

The soil is black, but  
further inward gets  
lighter.

The mixed forest has  
trees to 30 m. tall, the very  
large ones rather widely  
scattered, mostly buttressed,  
and sizes more or less  
regularly graded down  
to about 1 inch in diameter.  
Then very few saplings  
between this size and  
a foot or so tall.

This stretches over a  
considerable flat.

The soil is so  
compact that water  
has evidently stood  
on it. The ground layer  
of seedlings is very  
sparse. Almost no  
herbs.

Then an elevated  
terrace about 15 m.  
with a much thicker  
forest, generally  
smaller trees, many  
more lianas. The flora  
here is far richer and  
there is a more noticeable  
ground layer, still largely  
of seedlings. Some ferns,  
but these mostly on fallen  
tree trunks, where there  
are characteristic commu-  
nities of seedlings and  
ferns. In one place  
a very large tree had  
fallen, knocking down  
several others, which  
in turn knocked down  
others, making a swath  
well over 100 m. long.

This limestone terrace is  
rather compacted or weathered  
and silted up, so there  
is some gully erosion and  
water trickling over impervious  
layers in the bottoms of ravines.



At beginning of cliffs on ~~west~~ <sup>west</sup> side is an eroded terrace probably 6' with curious rimmed basins, and a series of exposed beachrock, exposed by removal of terrace 10' ~~back~~ <sup>back</sup> dipping landward (Photos 6-11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 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981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000)

Small islet has *Pernambus* on one end. (photos)

Beach beyond the terrace above is of gravel, is obviously being cut back, but there is a gravel ridge, in places very coarse. The vegetation here and just back is a tall forest of large *Barringtonia* and *Hernandia*. Along the coast this <sup>combination</sup> is dominant but in sandy places there may be *Calophyllum*. *Pandanus* thickets here and there, *P. tectorius*. *P. fragrans* seen once here, on rocky material.

Back of the top of the beach ridge the forest is largely *Barringtonia*, but with considerable *Hernandia* and *Occhrosia*. Locally but abundantly a thick shrub to sapling sized lower story

of *Ardisia* and *Aglaia*, with occasional young *Barringtonia*. Low thickets of *Pandanus* mixed with this. However, in most places one can walk freely. Fallen trees form the worst obstruction.

The ground is mostly pebbles and cobbles, in places masses of boulders.

The beach ridge has cut off areas of low-lying ground that support a stand of *Summitzia racemosa* growing to a height of 10-12 m., with abundant pneumatophores.

Along the gravel ridge are scattered *Pernambus* and *Tournefortia* trees, much less abundant than the *Pandanus*.

*Hibiscus tiliaceus* is fairly common, *Thespesia* much less so. *Allophylus* occasional to common. Most of these species grow out over the water, making walking along the beach difficult.



The flat land back of the sandy beach has no significant number of boulders. Some exposure of what may be an old platform near the beach.

But on the other side of the island, the narrow flat zone there has great masses of boulders and rubble, presumably thrown up by the 1893 tidal wave from Krakatau. Likewise, on the flat around the southwest side, where the ~~bridge~~ <sup>causeway</sup> bridge is of gravel, there is much gravelly and bouldery rubble back on the flat. The tidal wave

must have swirled around the end of the island and picked up considerable material and carried it inland.

From the channel the vegetation of the island looks of remarkably uniform height until the southwest corner is reached. Then it becomes very irregular.

The sandy beach <sup>flats</sup> generally supports a good forest of *Calophyllum*, fringed by a fringe of *Sophora tomentosa* and *Vitex*, with occasional patches of *Pandanus*, <sup>by the</sup> *Scaevola*, *Tournefortia*, <sup>Hernandia, Hibiscus,</sup> etc.

The gravelly beach ridge supports principally *Hernandia* & *Barringtonia*, with some *Occhrosia*.

Along the front are occasional bushes or small trees of *Pemphis*, *Calophyllum*, *Guettarda*, *Tournefortia*, etc.

No herbaceous growth except on sandy beaches where there has been disturbance, where one sees *Ipomoea pes-caprae*, *Stachytarpheta jamaicensis*, *Thysanotus*, etc.



Dec. 18 - Voljany Kulon River  
across from Pulau Pentjeng  
Island

Beach ridge, back  
of which is a swamp  
of *Nypa* and *Sonneratia*  
*alba*? *Nypa* abundantly  
flowering. Buds are  
distinctly warm when  
pressed to cheeks. The  
tips of the leaflets bear  
long filaments, connected  
along the margins at  
first, then stiffly spreading.  
The pneumatophores  
of this *Sonneratia* are  
more narrowly conical  
than those of *S. caseolaris*.

Back of the *Nypa* swamp  
is a strip of rattan  
swamp, with various  
trees, but an abundant  
understory of rattan.

Back of this a palm  
forest, *Arenga*, *Onocarpus*,  
etc. along a small stream.

Back of this two large  
clearings with grass,  
various secondary  
weed and shrub species  
and scattered trees.

In one pasture was a herd  
of 9-10 banteng. In the other,  
4 sambar deer, one herd of 7

banteng, another of  
4. Hornbills flew over  
2 jakin(?) storks. Jungle  
fowl. Many flying foxes  
coming to visit the *Sonneratia*  
trees.

Dec. 19 - Cape Sarjan  
(Java's Erste Punkt)  
Rocks at ultimate  
point bare - probably  
Eolianite, but stained  
black by algae.

One small abrupt islet  
with some thin grassy  
vegetation. Back of  
bar rock on mainland  
low scrub and grass  
mosaic, undoubtedly  
maintained thus by  
banteng grazing, probably  
rhinos also.

Back of this is low  
scrubby forest, rather  
tangled, this giving  
way to higher forest  
back toward landing.



Labels typed

protected  
sandy  
beach

39669

12

Dec. 18 - Pulau Pentjeng (island)

off of Ujung Kulon,  
Dense wet forest on  
coral limestone substratum.

*Tournefortia argentea* L.f.

occasional to rare in scrub  
at top of beach.

13 70

*Vitex*

common, forming fringe at  
top of sandy beach

12 71

*Ipomoea pes-caprae* L.

common locally on  
sand in disturbed  
places at top of beach

12 72

*Scaevola salicaria*

rare at top of beach

12 73

*Sophora tomentosa* L.

dominant in fringe  
at top of sandy beach

12 74

*Hibiscus tiliaceus* L.

common in edges of  
forest at top of beach

3 75

*Cassytha filiformis*

common locally at top  
of beach, parasitic on  
*Sophora tomentosa*.

same, exposed stony beach

12 76

*Barringtonia asiatica*

dominant in forest on  
stony ground back of beach

12 77

*Hernandia sonora* L.

codominant with *Barringtonia*  
on stony ground at top of beach

shrub 2.5 m. tall; leaves  
fleshy, frosty green; flowers  
white, fruit not mature.

shrub 3-4 m. tall;  
flowers lavender

prostrate, branches  
erect.

shrub 2 m. tall (others  
seen to 3-4 m.); flowers white.

shrub 3-4 m. tall;  
flowers bright yellow,  
scarcely any flowers.

semi-scandent tree;  
flowers bright yellow.  
(unopened at 6 a.m.).

stems soft, green; flowers  
white.

large tree.

large tree, fruit inflated,  
mouth of envelope  
without teeth.



- 39673 *Ochrosia oppositifolia* Lam.  
common in forest at top of beach
- 79 *Allophylus cobbe* Bl.  
common at top of beach
- 80 *Premna obtusifolia* R.Br.  
occasional at top of beach
- 81 *Pemphis acidula* Forst.  
occasional at top of beach
- 82 *Euphorbia charniovensis* Biss.  
very local at top of beach
- 83 *Croton*  
occasional at top of beach
- 84 *Guettarda speciosa* L.  
occasional at top of beach
- 85 *Ardisia (humilis?)*  
abundant in forest  
just back of beach  
and at tops of low cliffs
- 86 *Isora?*  
rare in edge of woods  
at top of beach
- 87 *Aglaia elaeagnoides* Benth.  
abundant on exposed  
top of low cliff
- 88 *Fernandesia cyrtosperma* R.Br.  
abundant at top of cliff  
same - inland on elevated limestone
- 89 *Tabernaemontana*  
rare in undergrowth
- 90 *Croton*  
rare in undergrowth
- 91 *Drymonoglossum?*  
common on fallen tree trunks

- small tree, lactiferous;  
buds flowers, and immature  
fruits in same inflorescences.  
large shrub; flowers  
white; fruit orange-red.
- broken tree; trunk 20 cm.  
diam. sterile  
branched at base; stems  
ascending; glands green;  
large shrub, 3-4 m. tall.
- large shrub 4 m. tall;  
flowers white.  
shrub 3 m. tall; fruit  
immature, pinkish green.
- slender shrub 2 m. tall,  
buds white.
- shrub 2 m. tall;  
buds yellow.
- loosely tufted.
- shrub 2.5 m. tall.  
flowers white.  
large shrub; ♂.  
leaves fleshy.



- 39692 (Euph.) *Trigonemon?*  
occasional in undergrowth
- 93 *Pecc*  
rare in undergrowth
- 94 *Vavaea palm-banica*  
very rare in under-  
story of forest
- ~~95 *Pteris*~~  
in high forest on  
low-lying flat
- 95 *Pteris*  
on fallen tree-trunk
- 96 *Asplenium*  
on fallen tree-trunk
- 97 *Euronymus javanicus* Bl.  
rare in undergrowth
- 98 *Cleidion* ??  
rare on forest floor
- 99 *Garcinia dulcis* (Roxb.) Kurz.  
occasional in lower story
- same top of sandy beach
- 9700 *Hernandia sonora* L.  
rare in fringe of forest  
(more common on rocky beach)

shrub 2.5 m. tall; flowers  
yellow.  
stems erect, to 3-5 m. tall,  
armed with vertical  
rows of prickles with  
broad base; sterile.  
slender tree about 10-15 m.  
tall, 15 cm. dbh. sterile.  
(only tree known)

rhizome very short,  
erect.

large shrub or small tree;  
fruit immature.  
flowers green.

small tree; latex yellowish.  
very slow-flowing from  
cut in trunk; fruit immature.

shrub 3 m. tall.



Labels typed

Dec. 19 - Cape Lajar

edge of forest back  
of beach

- 39701 *Reea sambucifolia*?  
common in undergrowth
- 3 02 *Cordia myxa* L.  
common in cleared  
roadway.

- 3 03 *Pyrostegia lanceolata*  
common on tree trunks

- 12 04 *Hedyotis albido-punctata* (Merr.) Frob. ?  
common in grassy cleared  
area, grazed by wild oxen.

open areas on rocks  
above sea shore

- 12 05 *Ipomoea littoralis* Bl.  
occasional

- 12 06 *Cyperus*  
local in rock crevices

- 12 07 *Phyllanthus*  
local in rock crevices  
and weedy places.

- 12 08 *Ischaemum muticum*?  
very common in grassy  
areas grazed by wild oxen.

- 1 09 *Justicia*  
local just back of  
sea shore in open place

- 1 10 *Cyperus kyllingia*  
local in weedy places.

shrub 2.5 m. tall.  
fruit immature brownish.  
small tree about 8-10  
m. tall; fruits dull  
pinkish, juice very  
glutinous. said to  
be used for glue.  
leaves leathery-fleshy.

prostrate; corolla white,  
salverform but with  
globose tube; scarcely  
any odor when broken.

prostrate, trailing; flowers  
bright magenta-purple.  
tufted; spikelets pale green.  
erect.

prostrate; panicles  
erect.

erect shrub to 1 m. tall;  
flowers very rare, dull  
whitish.  
heads white



397 11 (amer.)

- 1 rare in weedy place at foot of cliff.
- 12 12 *Echachium* sp. (intermedium?) abundant on cliff of volcanic tuff.
- 12 13 *Fimbristylis cymosa* R.Br. common on cliff of volcanic tuff.
- 12 14 *Zoysia* common on cliff of volcanic tuff.
- 12 15 *Hedyotis albido-punctata*? common in crevices of cliff of volcanic tuff.
- 3 16 *Ficus* (Lorenz says *F. septica*, but does not have ribbed fruit) common in edges of thickets just back of shore.
- 12 17 *Ardisia (humilis?)* common in thickets just back of shore.
- 1 18 *Randia* rare in thickets just back of shore.

erect.

branched at base.

loosely tufted.

forming loose mat, culms erect from prostrate bases. leaves very fleshy; corolla white lobes patent tube globose. large shrub; figs green depressed globose, definitely not ribbed.

erect shrub 3 m. tall; fruiting branchlets articulate to main stems, but not detaching readily; flowers dull magenta purple; fruits immature. erect shrub 2 m. tall, with drooping to erect branches; flowers dull yellow.



Dec. 19 - Paulau Handeuleum

*Pemphix acidula*  
good stand on small coral  
gravel. feedlings on gravel  
beneath.

*Guettarda speciosa*  
*Hibiscus tiliaceus*  
*Zhesperia populnea*  
*Desmodium umbellatum*

*Duguetia*  
*Pyrosia*  
*Cassytha filiformis*  
*Crinum*

*Ardisia (humilis?)*

*Lantana camara*

*Cayratia*

*Premna obtusifolia*

*Wedelia biflora*

*Davallia solida*

*Acrostichum aureum*

*Cycas circinalis*

*Pandanus tectorius*

*Desis trifoliata*

*Ipomoea (or Porretta)*

*Leea sambucifolia*

*Mangifera indica*

*Ficus gibbosa*

*Nephrolepis hirsutula*

*Hedyotis biflora*

*Macaranga tanarino*

*Bridelia tomentosa?*

*Buchanania floribunda*

*Glochidion*

*Ciba pentandra*

*Leucaena glauca*

*Annona muricata*

*Psidium guajava*

*Musa sapientum*

*Carica papaya*

*Peperomia pellucida*

*Acalypha indica*

*Pteris longicrista?*

*Ananas comosus*

*Ageratum conyzoides*

*Sporobolus diander?*

*Eragrostis amabilis*

*Piper aduncum*

*Neonaxia*

*Leucaena spontanea*

*Morinda citrifolia*

*Scaevola sericea*

*Fimbristylis cymosa*

*Eupatorium*

*Gmelina*

*Lolanthus sp.*

*Euphorbia hirta*

*Chrysopogon aciculatus*

*Stachytarpheta jamaicensis*

*Ficus septica*

*Rademacheria gigantea*

*Hernandia*

*Tacca palmata*

*Blumea balsamea?*

*Dendrobium*

*Oberonia*

*Phallosopsis amabilis*

*Jatropha gossypifolia*

*Cassipourea frutescens*



*Sonneratia*  
*Antisia bajung*  
*Goats nuxifera*  
*Eupatorium balsamum*  
~~*Bursera*~~  
*Alternanthera versicolor*  
~~*fabalium*~~  
*Digitaria* 2 sp  
*Calisia argentea*  
~~*from rot*~~  
*Mirabilis jalapa*  
*Cosmos sulfurea*  
*Fraxinella lanceolata*?  
*Rhizophora apiculata*

Forested ~~for~~ border, mostly  
 strand species. Cultivated  
 area around houses. Then  
 a large open area covered  
 by a ~~floor~~ scrub about 1-1.5 m  
 high of *Lantana camara*,  
 pale green in color, but  
 flowering and occasionally  
 fruiting. Some *Blumea* here,  
 scattered *Ardisia*.

In the interior, somewhat  
 surrounded by the scrub,  
 are several exposures of  
 "fao", with thick woods  
 of *Buchanania*, *Radermachia*,  
*Glochidion*, *Ficus septica*,  
*F. gibbosa*, *Morinda citrifolia*,  
 etc.

Other small islands  
 largely mangrove -  
*Rhizophora* around  
 edges, *Sonneratia* in  
 interior, *Pemphis* on  
 gravel banks.

On the mainland is a  
 broad flat, with an  
 extensive pasture, mostly  
 in *Chrysopogon aciculatus*,  
 with clumps of *Lantana*,  
*Eupatorium*, *Ardisia*, *quana*,

scattered *Lagerstroemia*  
 trees and *Corypha*

Herd of over a dozen bantangs  
 and about a dozen deer.  
 Bantangs 2 colors, dull  
 brown and red-brown.  
 Perhaps sex differences?



90 1958 Jan 9

Dec. 19 Tendong Kalund

39719 *Desmos cochinchinensis*  
in ~~thicket~~ thicket at edge of pasture

20 *Cudrania javanica*  
occasional in cleared game pasture

21 *Fimbristylis cynosu*  
top of sandy beach, open.

Dec. 19 Pulau Handeuleum,  
low coral islet.

22 *Smyntha*? <sup>negundo</sup>  
local in Pemphis forest  
on small gravel just  
inside beach

23 *Pemphis acidula*  
dominant in forest on  
small gravel flat just  
inside beach

24 *Thunbergia*  
small patches in  
Pemphis forest not far from beach

25 *Blumea*  
occasional in Pantang  
scrub on very thin soil

26 *Bridelia*  
occasional in forest

27 *Glochidion*  
common in forest and  
forest edges.

91

climber, flowers yellow,  
turning green; leaves  
slightly glaucous beneath.  
lactiferous depressed  
shrub, sterile. Dwarfed  
form from pasture.  
densely caespitose.

prostrate vine,  
not lactiferous; sterile.

small tree, ~~flower~~  
5 m. tall; grayish green;  
flowers white.

prostrate, forming  
thin mat; floriferous  
culms erect.

herb 2 m. tall, very  
aromatic; heads yellow.

semi-scandent  
shrub 3 m. tall; leaves  
slightly glaucous beneath,  
sterile.

small tree; fruit green,  
seeds red.



- 3978 *Ximenia americana* L.  
near outer beach in front
- 3 29 *Digitaria*  
common around dwelling
- 12 30 *Digitaria*  
common around dwelling
- 12 31 *Digitaria*  
common around dwelling
- 3 32 *Tacca palmata*  
common in stony trail  
in shade
- 1 33 *Emilia sonchifolia*  
occasional ~~at~~ in grassy  
place around dwelling
- 6 34 *Ixora*  
common in undergrowth
- 3 35 *Desmodium umbellatum*  
very common in undergrowth
- 1 36 (alga)  
parasitic on *Tacca palmata* leaves.

Dec. 22 - Pasir putih

- 3 37 *Aegiceras corniculata*  
pure stand on basaltic  
rocks covered by salt water  
at high and medium tides.
- 12 38 (Lamys?)  
on basaltic rocks well above  
~~at~~ tide level
- 1 39 (Asclep?)  
on basaltic rocks well  
above high tide
- 3 40 *Hibiscus tiliaceus*

shrub; fruit immature.

flowers purple.

flowers purplish.

shrub 2 m. tall,  
flowers white, <sup>fruiting</sup> ~~the~~ fruit black.  
shrub to 3-4 m. tall,  
flowers white, fugacious,  
causing necrotic spots.

shrubs 1.5 m. tall; leaves  
thick brittle; flowers white;  
fruit immature.

scandent; flowers white.

lactiferous vine; flowers  
dull yellowish white.

rather erect tree 5 m. tall flower  
bright yellow, fading reddish.



Dec. 20 - Krakatau Volcano  
 Krakatau<sup>313m</sup>, Verlaten<sup>187m</sup> I., Lang<sup>142m</sup> I.  
 and Anak Krakatau<sup>135m</sup>.  
 (Hebe I. in background) (photos)

The three older Krakatau Islands are arranged like Mang, and indeed would be very much like it except that Krakatau itself is so much higher.

Anak Krakatau is in a state of continuous pulsating activity, with an explosion every few minutes, throwing ash to considerable heights. There is a large crater and smooth ash slopes, dark brown in color down to low wave cut cliffs, except at one end where the slope ends at beach level. Apparently some coral debris has been cast up here, as the top of the beach is light colored. Here a small patch of Casuarinas have reached tree size. A few are scattered on the slopes, fair sized but only 3 or 4 in number.

The three outer islands are well wooded except on the steepest cliffs, which are mostly grassy

but locally completely bare. The material of these, where exposed, is very light colored and bedded. The bedding is in places irregular probably because of slumping.

The forest on Krakatau is luxuriant to the top. Casuarina is an important component, mostly in patches. Terminalia catappa is perhaps the most important in terms of area, covering much of the lower slopes. However there are a good many species and the forest is generally a dense mixed forest. No grass now except on the steep inner wall.



Dec. 21 - Bus Trip Bogor - Bandung

W. of Bandung rice is fertilized and straw is rotted and incorporated into soil. Elsewhere burned and ash incorporated.

Here are conspicuous areas of coconuts with understory of bananas.

Then large very flat area entirely devoted to rice. Limestone outcrops. Old coral reefs. Either an old lake bed or inland sea.

Limestone mts. almost completely deforested. Veg. of *Leucaena* and *Scaevola* spontaneous, etc.

Infestation of *Oryctes* on coconuts at Padalarang, W. of Bandung.

Bandung - Luradung.

Large plain, old lake bed surrounded by mountains, all in rice, except around villages. Where road goes through mountains is a deep winding gorge with traces of forest on its walls.

6 km. beyond Tjimalaka - photos of rice landscape & children

Farther on are ranges of limestone hills and peaks. The lower slopes of these are covered by planted teak

forest. Teak said to have been introduced  $\approx$  1000 years ago. Bands of *Leucaena macrophylla* planted with teak for fire control. *Acacia auriculiformis* planted on very degraded soils. These soils in limestone region are called "marl" soils.

Marul Hills - very steep and rugged, limestone, entirely deforested, covered by *Imperata*, which is not very luxuriant.

Tjirebon Plain - secondary vegetation of fence rows, and waste spots is largely bamboo. East of Tjirebon along the coast *Borassus* appears. In this plain mostly rice is cultivated, but some sugar cane. Near coast waste spots dominated by *Leucaena glauca*, but these are few waste spots. Road lined with *Tamarindus*, mostly more or less pollarded. A few km. <sup>east</sup> ~~west~~ *Opuntia* appears along roadside.

Large areas of paddy land fallow and grazed by water buffaloes. Some being plowed and planted.

About Gebangilis *Oryctes* damage to coconuts conspicuous.



Vast low-lying poorly drained flats back of coast, dominated by sedge when fallow. Many vegetables cultivated here.

East of Tegal are plantings of *Pennisetum grandiflorum*. Lvs. fed to goats, flowers to people.

About 50 km. W. of Kendal starts a region of low hills with well grown teak plantations, some being cut. Ringed 2 years earlier to kill trees.

Small *Metroxylon* swamp here in ravines. Much bamboo in waste spots.

Ornate damage at Kendal.

East of Semarang the country is hilly, cleared, with scattered coconuts, a few secondary thickets, grass, scarcely any rice. Eastward rice gradually appears. Apparently water is controlling factor. Manihot planted where not enough water for rice.

To eastward and southward a number of volcanoes are scattered about the landscape. Some are active.

Holo

teak, and to go from our during dry season. Clean-felled, all coppice



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1. The first part of the document is a list of the names of the persons who were present at the meeting. The names are listed in alphabetical order.

2. The second part of the document is a list of the topics discussed at the meeting.

1. The first topic discussed was the progress of the work done since the last meeting. The members of the committee reported on the work they had done.

3. The third part of the document is a list of the resolutions passed at the meeting.

1. The first resolution passed was that the committee should continue its work on the subject of the proposed new law.

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Dec. 22 - ~~Solo~~ - ~~Solo~~ -

In the palace grounds at ~~Solo~~ a bright yellow flowered form of *Turnera ulmifolia* is planted as an ornamental (looks like the one in Malé?).

*Ficus burzi* (*F. benjamina* but with aerial roots) planted as sacred tree - beautiful examples, surrounded by walls - banyan habit.

*Muntingia* perhaps the commonest street tree (also seen very commonly yesterday in most towns and villages.) Fruit, said to be much eaten by children.

20 year old teak plantations east of Solo (photos). Tall straight trees. Shrub layer of coffee from trees cut out by thinning left to cut down fire hazard. Undergrowth of *Loucheva* in some parts, planted with teak, to cut down fire hazard and to protect soil from sun during dry season. Clean-felled, all coffee



pulled out by roots, used for firewood. Replanting by seed. 4 seeds planted, best seedling selected. Teak forest a complete government monopoly. To cut a teak tree in downyand permission required from forest officers. All teak land (2000000 acres) government owned. 10-15% of teak timber exported.

Soils east of Solo for some distance seem to be mostly regur (black cotton soils).

Rivers and streams through this area very muddy.

East of Solo the villages are surrounded by rows of thorny bamboo. East of Madura bamboo practically dominates the landscape.

Flat-topped *Acacia tomentosa* becomes prominent, said to be spontaneous. Tamarind still lines roads. Coconuts much less common here. Rice is dominant through this entire area.

Near the sea, in the vicinity of Pasuruan *Opuntia* and *Borassus* reappear. Soil is black.

Warrung, set Probolinggo, Jendang Limestone bluff overlooking sea degraded scrub of *Opuntia*, *Lantana*, *Patropia*, *gossypifolia*, *Ficus*, *Melia*, and a dry grass, possibly *Eulalia*.

Eastward along coast toward Pasirputih the bamboo around the villages becomes very scarce.

At Pasirputih the sand of the beach is almost black with an admixture of white coral sand. The rocks coming down and forming the point are iron gray pillow-basalts, apparently a thick flow. The surface weathers darker than the normal color of the rock.

Teak forest with dense undergrowth here.

Dec. 23 - Pasirputih

fire climax forest on basalt slope - *Schleichera*, *Albizia lebbioides*, *Homalium tomentosum*, *Lebontenia*, *Flacourtia*, *Uraria*, *Lantana*, *Ficus*, etc. Trees rather scattered, shrub layer continuous. *Lantana* dominant in shrub layer.



Part of it less degraded, with more or less continuous layer of trees, incl. *Proteum*, *Sterculia foetida*, plus those mentioned above. (Driest region in Java - rain less than 1000 mm. in a wet season of 2 1/2 mo.)

Here the undergrowth is thick. ~~Almost~~ Many of the trees lose their leaves during dry season. Only *Schleichera*, *Schoutenia* and *Garcinia* retain leaves. Undergrowth completely deciduous, herbaceous, part disappears.

Soil thin and black "Andesitic-basalt" outcrops generally. Old flow.

The more wooded part is in a valley

Dec. 23 Pasirputih to Babaran

at Asambagus photos of ox cart, horse cart, stags, etc.

West of here a large flat area has been cleared and plowed for large scale cotton planting. Scattered *Azadirachta* trees left, forming a sort of savanna landscape.

From Soembereijen a dry sloping savanna, very rocky, said to be severely burned every August. Certainly looks that way. This is lower slope of Babaran volcano. Commonest tree *Schleichera olerosa*. Teak plantation below road. Above road where it circles mountain is a more closed, tangled open forest. Shallow dark brown to blackish soil.

Teak plantations almost all young, some very young. Interplanted with *Leucaena*, occasionally *Acacia* or *rabies*.

This all on foot slopes of volcano, very gentle slope, very rocky.

*Tamarindus* planted along road.

From end of surfaced road the vegetation is mostly more or less natural, except for occasional small plantings of *Leucaena*. This *Leucaena* is coppiced and grows up to clumps of thin wands, as thick as a thumb and 3-4 m. tall. few leaves, clumps of fruits.



The vegetation varies from a tangled thicket, choked with Lantana and vines, trees mostly with crowns not touching through open forest with a dense scrub layer of Lantana camara, to savanna with grass and scattered trees and clumps of thicket.

The grass is dry, barely starting to send up tiny shoots, more advanced where it has been burned.

On flat ground are areas of grass on conspicuously cracked, polygon ground, black soil.

The forest is partly thorny, and partly deciduous, partly microphyllous.

### Talpat, Balocera -

Dissected lower slopes of the volcano, drastically burned over, with sparse tufts of several kinds of grasses, a few scattered small trees of various kinds -

Phyllanthus emblica, Morinda sp., acacia leucophloea, Grewia,

Agave americana

etc. a few small herbs - Buchnera, Vernonia 2 spp. Euphorbia, etc.

Gallery forest in ravines - rather dense - Spondias, Premna, Ficus, Morinda, Grewia, Pisonia <sup>aculeata</sup>, Phyllanthus emblica, Schleichera, etc. A tiny trickle of water in canyon.

Spondias ~~fruits~~ stone scattered over dry hillside, well above Spondias trees. Bats said to be present.

(Photos of mountain side & deep canyon)

The flat grassy areas with cracked soil have scarcely any trees.

They are surrounded by areas of savanna and of open <sup>or semideciduous</sup> deciduous forest. (photos, ending Kd. vol 3.)

This around lookout near waterhole.

Lookout on small scoria cone

On flatter ground below Talpat scattered trees of Acacia, flat topped and spreading. Ground in low spots deeply cracked. Leucaena planted along road for some distance on both sides.

(to p 110)



Dec. 24 - Pasirputih  
degraded forest on steep  
slope of basaltic rock  
with thin soil

- 39741 *Schleichera*  
very common tree in open forest
- 2 42 *Randia*?  
in open
- 5 43  
rare in undergrowth
- 5 44 (*Lamproloma*? *Cassia*?)  
common in undergrowth
- 3 45 *Callicarpa*  
rare in undergrowth
- 1 46 *Tabernaemontana*  
rare in undergrowth
- 3 47 *Wedelia*  
occasional in open
- 3 48 *Randia*  
occasional in undergrowth
- 1 49 *Thunbergia alata*  
rare in open

Dec. 24 - Bekol

- 3 50 *Schoutenia ovata*  
common in open forest

Dec. 24 - Talpat, north  
base of Baloran Volcano  
gallery forest in ravine

- 4 51 *Premna*  
occasional

small tree,

scandent shrub;  
flower greenish.

small shrub; flowers  
white; fruit immature.

scandent shrub or  
liane; flowers white.

depressed shrub; flowers  
pinkish purple.

small shrub; flower  
white.

depressed herb; rays yellow.

shrub 1.5 m. tall;  
flowers white.

flowers white.

shrub

small tree, aromatic;  
fruit immature.



- 39752 *Spondias mombin*  
5 one tree in gallery forest  
in ravine
- 2 53 *Morinda*  
very common
- 3 54 *Vitex*  
occasional
- 3 55 *Zizyphus*  
common
- 1 56 *Disoclea*  
common, twining in shrubs
- 1 57 *Vernonia*  
common in open grassland
- 1 58 *Euphorbia*  
rare in open burned grassland
- 1 59 *Buchnera*  
rare in open burned grassland
- 2 60 *Morinda*  
common
- 1 61 *Grewia*  
occasional

Dec. 25 - Worejo, north of base  
of Baloran Volcano  
Dry thickets in savanna

- 3 62 *Morinda*  
common
- 2 63 *Abutilon indicum* (L.) Sweet det.  
common under trees in Fryxell
- 3 64 *Grewia*  
common ~~is~~ on small hill
- 1 65 *Cissus*  
with anderson

tree about 10 m. tall;  
fruit

small tree; fruit  
green.

small tree

small tree

leafless

sprouts from base of  
old sticks; flowers purple.  
glands white.

flowers whitish.

small tree; flowers  
white

small tree or shrub,  
2.5 m. tall, flowers  
yellow, fruit immature.

spreading tree 2 m. tall; fruit  
immature; said to be eaten when ripe.  
suffrutescent herb or slender  
shrub 1.5 m. tall; flowers  
orange ~~yellow~~.

small tree.

sterile.



Dec. 25 Coast north of Banjuwangi

39768

Capparis

occasional in dry thickets

69

Trientalis

common on hills along shore

scandent shrub

prostrate, sub-glabrous, flowers pale lavender

cracks in <sup>black</sup> soil up to several cm. wide and at least 1 m. deep.

In ravines and low spots a tangled gallery forest. (Photos ~~but~~ <sup>first</sup> 5 & 6 on roll 4, incl. *Cassia fistula*.)

On slopes a mixed savanna with *Acacia leucophloea*, *Phyllanthus emblica*, *Cassia fistula*, *Bauhinia* sp., *Azadirachta indica*, etc.

(half dozen photos, K. & B. & W.)

(Photos of cracked ground and grassland on it)

Around trees and clump of trees in savanna tend to be concentration of shrubs, mostly scandent and semi-scandent (photos)

Photos from lookout. Behol.

The shrubs run together to form a tangled layer about 2 m. high where the trees are close enough to form an open forest. This in most places is largely *Lantana camara*, which is deciduous here.

with Kain

Dec. 25 Wongsorejo

39766

*Acorus calamus* L.

small clump along stream

67

*Thunbergia alata*

common around buildings

Wongsorejo - Banjuwangi  
great trees along road of  
*Salmaria malabarica* (Baker,  
n. 1), *Lamanea*, etc.

*Tamarindus* has disappeared.

Wongsorejo - Ceiba very abundant. Bananas produced for export.

Dry hills approach shore at narrowest part of Bali Strait. Covered by low tangled scrub forest.

Beyond here *Tamarindus* reappears. Coconut plantations with or without understory of bananas very extensive on coastal flats here.

Maize also planted under coconuts. Coconuts here healthy looking, but near Wongsorejo were very yellow - said to be attacked by a pest.

Trees start bearing at 6 years, considered too old at 30 years.

Manihot also planted under trees. Laborers who care for trees and make copra plant the crops between the trees as their compensation.

erect, with aromatic soapod-  
twines, flowers pale lavender.



Dec. 25 - Gilimanuk (Road of the Birds) drab looking port, landed on beach down a plank from ferry. *Azadirachta*, *Hibiscus tiliaceus*, *Lanea grandis* (more or less bare)

Along road for 2-3 km. is a striking open forest of *Brassia*

then dense thicket or tangled scrub forest, especially on the right. On left some mangroves. Raining very hard.

The *Brassia* has grass beneath, no shrubs. Said to be burned twice a year. Spacing between savanna and open forest.

Photos (now 28-30) of typical tangled 2nd growth landscape of North Bali. Saw several white storks. This is game reserve.

Gunung Sangyang (God's Mt.) is a spectacular dissected volcano.

The country after the game reserve is densely cultivated, mostly in maize or kapok & maize.

Pula Pulahi - temple - spectacular, tall cliffs. Many gray monkeys. (photos). (photos of brown). *Brassia* very abundant in this vicinity near shore. *Acacia leucophloea*. large flat-topped trees.

Lower slopes degraded to savanna, <sup>(photo)</sup> very much resembling the lower ridges on S.E. Oahu. The higher mts. also resemble the Koolaus from a distance.

A large area of Coconuts with an understory of bananas, very luxuriant. Large flat area of rice, very luxuriant also.

Then more coconuts + bananas, with some areas of Maize. Rice and vegetable mosaic app. *Limardja*.

Dec. 26 - Bedugul, Lake Bratan.

Drymaria here has medical pills, not visited. reports either pills or plasters, or even info.

4700' Across lake a long ridge with plantation on one side, the steep side above lake still in fairly good montane forest - abundant epiphytes, main genera *Litsea*, *Mitchelia*, *Eugenia*, *Schefflera*, *Morcania*.



Dec. 26 Bedugul, on Lake  
Bratan

39770 *Drymonia*

on cut banks of volcanic soil  
near building

71 *Ernilia sonchifolia* (L.) DC.  
on masonry wall just  
above lake

72 *Ficus aurantiaca* var. *parvifolia* (Graz)  
common; montane rain forest on ridge

73 *Adinandra*

common in montane forest

74 *Lambucerus*

very common in open places  
along trail

75

75 *Michelia* ( ) glauca

occasional in wet forest on ridge

76 ~~Michelia~~ *Astronia*

occasional in wet forest on ridge

77 *Rubus*

common along trail in wet forest  
on ridge

4200'

1280m

weakly erect.

flowers purplish pink

det. Corner

Corner

4700'

↓

1440m

woody climber reaching  
high in trees, fruit  
depressed globose, deep  
orange spotted with white,  
turning soft and deep maroon  
on becoming fully ripe.  
Lower parts, even when  
fruiting, appressed to tree,  
parts high in tree with  
larger leaves and spreading  
branches, also fruiting (not collected).

tree; flowers whitish.

shrub 2 m. tall (reaching 3 m.)  
flowers white (no yellow  
glands in inflorescence), in  
flat to roundish topped  
cymes. Old inflorescence  
purple setting very few fruits,  
these immature.

tree. leaves glaucous  
beneath.

tree; inflorescence and  
flowers pink.

scandent shrub,  
flowers white.



1958 Bali Podocarpus, Casuarina  
Medinilla, many Urticaceae, cf. Rapanea  
with epiphytic Ferns,  
many ferns, orchids,  
grasses, Freycinetia,  
Rubus moluccensis in  
undergrowth, with very  
conspicuous laciniate bract  
in young inflorescence.

Othe "Laportea" with long  
pendent blue inflorescences  
and very fleshy translucent  
fruits.

† readers not seen but possibly present.

Most of these slopes, even the highest, except those almost vertical are covered by coffee plantation with overstory of *Crythrina* sp. Some native plants in ravines. Mostly *C. robusta*; said to be some *C. arabica*.

lingaradja to Penulisan Pass

Climbed through complex of  
Coconuts, fruit trees, rice terraces  
to over 2500', replaced by ~~coffee~~  
coffee plantation with Erythrina.

At about 4000' they start to be small farms. At perhaps 5000' there are remnants of native forest, plus plantations of Casuarina, Cupressus macrocarpa, Widdingtonia. This area

seems moderately wet.

Hotel Kintamani

Along photos of volcanoes Agung  
Tibung and Batur  
and caldera lake - Batur

Photos of Kahan temple.  
Bangli

Photos of Agung Volcano  
and rice paddy fields  
below Bangli.

Photos of Elephant Cave (b.w.)  
bathing place, archeological material

Bali pigs are a strange breed, elongate, with a deep sag in their back and a pot belly; black and pink in color.

Bali cattle look much like the wild banteng, females red, males dark, blackish, all with the conspicuous white patch on the backs of the legs, only the variability in the horns suggesting any hybrid ancestry. Some have banteng horns, others slightly suggest Zebu.



Fosberg & Roslermann  
Dec. 26 -

Bedugul

39778 *Carica*

2

in dense primary forest

2 79 *Carica*

in dense primary forest

Labels  
addedDec. 26 Hotel Kintamani  
dooryard1 80 *Drymaria villosa*occasional, with *D. cordata*1 81 *Drymaria cordata* (L.) Willd.  
common

Dec. 27 Sacred Forest of Bangels

dense tall forest of Dipterocarp

2 82 *Pisonia silvestris*

second story tree in

2 83 *Baccaurea*?

in undergrowth

84 *Dipterocarpus hasseltii*  
dominant tree in

3 85 (Pult.)

common in undergrowth in

4 86 *Psychotria rubra*?

rare in undergrowth in

brought in by native collector

low branching thick  
stemmed rosette tree;  
(flowers whitish. ♀.  
same ♂ & ♀.)leaves plane; fruits immature  
pulp tightly filling  
cavity around seeds.

pedicels very viscid.

tree 20 m. tall, fruit  
very sticky.  
shrub 1 m. tall.material picked up from  
ground under trees 40 m. tall,  
flowers pink.shrub 1 m. tall, aromatic  
when broken; flowers white,  
fruit gray-green.small shrub, fruit red, fleshy.  
flowers greenish-white.



Dec 27 - Sibang

Photos of market and village temple 1st 10-11 on roll 2. Kod.

Sangeh - Sacred forest of *Dipterocarpus hasseltii* & *Pisonia silvestris* (photos Kod. 2. Kod.)

Trees more or less uniformly about 40 m. but dbh varies from 25 cm. to 100 cm. Trunks smooth for 30 m. scattered second layer 10-20 m. *Pisonia* & saplings. dense ~~grass~~ <sup>shrub</sup> layer 1-2 m. more varied comp.

Epiphytes in canopy.

Gray monkeys around temples.

(see Womersley forest around burial grounds in N. 9.)

Village complex - coconuts, arenga, areca, ~~and other~~ jack, breadfruit, mango, citrus, Musa, bamboo, *Hibiscus tiliaceus*, *Salakka*, *Ceiba*, *Carica*, *Manihot*, *Eugenia cinnamomea*, *Blumea*.

Gulingan temple - ~~the~~ Kod. photos rice edundee temple.

End Kod roll 1 in Uluwatu Village - mud walls, etc. Sadeh temple (Kod. 8-10 beginning of roll 1.)

Coconuts and arenga attacked by *Anagae*, areca not. Coconuts more damaged than arenga.

The palms commonly seen are *Cocos nucifera*, *Arenga pinnata*, *Areca cathecu*, less commonly, *Salakka edulis*, <sup>edulis</sup> commonly a slender very tall fan palm.

Houses generally walled with mud or masonry walls. Tops of mud walls protected by thatching. Mud walls made of large blocks cut from earth.

Cows kept in special small bamboo shelters. Cows washed twice a day. Pigs abundant, one of most important exports, second only to coffee. Pigs exported alive in cylindrical bamboo cages. Sent as far as Hongkong and Singapore.

Between Denpasar and Lumban *Pisonia grandis* var. *alba* is common. Not seen elsewhere in Bali.



- 39787 *Psychotria*  
common in undergrowth in
- 3 88 *Pavetta*  
common in undergrowth in
- 1 89 *Melastoma*  
occasional around edges of
- 1 90 *Hedyotis biflora* (L.)  
on steps of temple
- 2 91 ~~Dipterocarpus~~ *Dipterocarpus* <sup>*hasseltii*</sup>  
common in undergrowth  
as seedlings.

Dec. 27 - ~~Padang~~ <sup>Sadeh</sup> Temple

- 1 92 *Mollugo*  
occasional
- 1 93 *Dentella serpyllifolia*  
abundant

with <sup>Portulacaceae</sup>  
1 94 *Ximenesia americana* L.  
in beach vegetation

Dec 28. Denpasar to Gilimanuk  
Generally the area near  
Gilimanuk is scarcely  
like Bali. Scattered houses,  
few villages, no rice, almost  
no temples, some second  
growth, fence rows of  
*Euphorbia nervifolia*, maize

shrub; flowers white;  
fruit orange when ripe.  
shrub 1 m. tall; flowers  
white; fruit immature.  
shrub 1 m. tall; flowers  
deep rose purple.  
buds white.

These seedlings, with  
hairy stipules, mixed  
with and intergrading  
with those with glabrous  
stipules.

stems spreading

forming very flat mat;  
flowers dull white.

fruit yellow, sour, with  
pou flavor, but flesh  
unusually thick.

the most important crop.  
Small development of  
mangrove (seen nowhere  
else on island), conspicuous  
groves of *Brassia* (photos).  
Black sand beach at Gilimanuk  
part magnetite, part *staurolite*?  
or *argite*? (sample).



The flat land of Bali, the coastal plain, except for the part around Gilimanuk is very intensively cultivated, mostly in rice where water is available for irrigation. In places even the dikes in the rice fields have a row of beans planted in them, or Sesbania.

Bali varies from <sup>one</sup> local region to another in the pattern of cultivation, etc.

*Imperata cylindrica* occurs generally, but is also planted, especially on steep slopes, for use as thatch. Said to last 8-10 years, while coconut leaves last one year. Arenga sheath fiber, used mostly on temple roofs, said to last 50-60 years.



Dec. 28 - Banjuwangi - Djember  
From Banjuwangi south  
largely coconuts, then  
rice. This continues - flat  
rice fields with "islands"  
of village complex, more or  
less the same to Genteng.

West of Genteng coffee  
begins to appear, shaded by  
Lencarna, etc. at about 700-800'.  
Rubber starts somewhat  
west of this. Still large  
coconut plantations.

Coffee soon dominant, and  
continues so till we climb  
a mountain mass. Here ~~degraded~~  
degraded forest with climbing  
fambro (a very wide-leaved  
sp.) appears at about 1800' and  
coffee disappears at about 2200-  
2300', replaced by the degraded  
very dense forest - under  
layer a terrific tangle,  
~~at~~ 5-10 m. tall. scattered  
large trees remain from  
original forest. On the  
other side of this ~~hill~~  
hill coffee does not  
reappear, but there is a  
little teak, suggesting  
that the hill is limestone.

Then ~~the~~ rolling to some-  
what dissected country  
with rice. Imperata,

bananas,  
trees, etc. villages.  
18 ~~km~~ km. S. of Djember  
an area of old karst  
topography, much  
worn down.

<sup>terrible rain</sup>  
Djember - Probolinggo  
Tobacco - rice - sugar - rubber  
coffee areas. Oak trees on low hills.  
Numerous dissected  
volcano - Round to right.

North of Lumajang a great  
irrigation canal between  
dikes, level of water well  
above that of rice fields,  
giving the appearance of  
floods. Very green.

Xanthosoma sagittata  
much the commonest terato-  
rial aroid in Java.

Evidence of a serious flood  
just south of Djember  
Follow canal toward  
Semeru Volcano, <sup>3770m</sup> highest  
pt. in Java. Lamongan  
on V. on right. Said to be  
lakes or maars in small  
~~one~~ vents on side of Lamongan.

Much sugar and rice  
in former marsh or old  
lake bed, now floods on sides  
of great canal.

A few km. S. of Probolinggo  
rather high ground with



mostly maize, little or no rice. Dark reddish brown soil. Great volcanic boulders in stream beds. Scattered clumps and rows of bamboos.

Rice again at Letjies.

Streams in this entire region very muddy. There has just been a very hard rain.

Vast rice fields.

Probolinggo - Madium  
West of Probolinggo a few km. a low coast with clumps of a very low Pandanus in otherwise bare mud flats. Intricate network of fish traps in shallow muddy water.

Dec. 29 Madium to Puncokerto  
Madium River very high, very muddy.

N. e. of ~~Madium~~ a large area of rolling hills with teak forest plantation in various stages some fallow land.

Teak leaves harvested and taken to market for use as wrappers.

*Ipomoea carnea* very common along roads and in fence rows.

About here the large *Tamarindus* trees disappear from roadsides.

Photos (hot.) of rice planting <sup>now</sup> ~~first~~ of ~~Lussemburgh~~ ~~photos~~.  
Bragen.

Photos of rice harvest 24 km. sw. of Solo.

Tobacco and sugar in this region, as well as rice. Large tobacco barns. ~~Many~~ peanuts seen around Klaten.

Photo of edge of village of ~~Gondang~~ Gondang.

Temple at Prambanan - photos - being restored, work going on since 40 years. Huge *Terminalia catappa* trees in courtyard. Ruins said to date from 9th century Hindu culture. Statues of Vishnu, Shiva, etc.

Another smaller temple not restored, at Kalantana.

*Kennedy* *Bragg* (hot) in *Jogjakarta* *Indo*. Very shaggyish. Tongue yellow, forked.

Barobura. Minors aspen along edges of rice fields.

Limestone range to south almost completely deforested.



grassy and in places  
badly eroded. Lower slope  
with some secondary woods.

Brubudantupa, solid  
dates from 778 AD - restored,  
but original stones and  
images used. 504 images  
of Buddha, a missing taken to Lian  
by Chulalongkorn. (Many photos)

Kepumen region - most  
densely populated area in Java  
1400 per sq. km. Village complex  
appears to occupy more ground  
than rice fields. Some rice  
fields have gardens  
raised a few inches above  
water level.

Just west of here a low  
range of grassy hills -  
Impatiens.

On a few miles to right  
is a low mt. range, almost  
completely deforested, except  
for a few tufts of trees on  
several hilltops. Some  
Hevea plantation. Lower  
slopes in coconuts, mostly.

Dec. 30 Purwokerto to Bogor.  
South of Purwokerto limestone  
hills with teak plantation.  
Grazing permitted in teak  
plantations, and erosion

is not prevented. Rivers  
exceedingly muddy.  
Lowlands south and west  
are rice plus village  
complex.

in village complex (E of Wangan)

Coconut

Bamboo

Hibiscus tiliaceus

Bala

incinatus

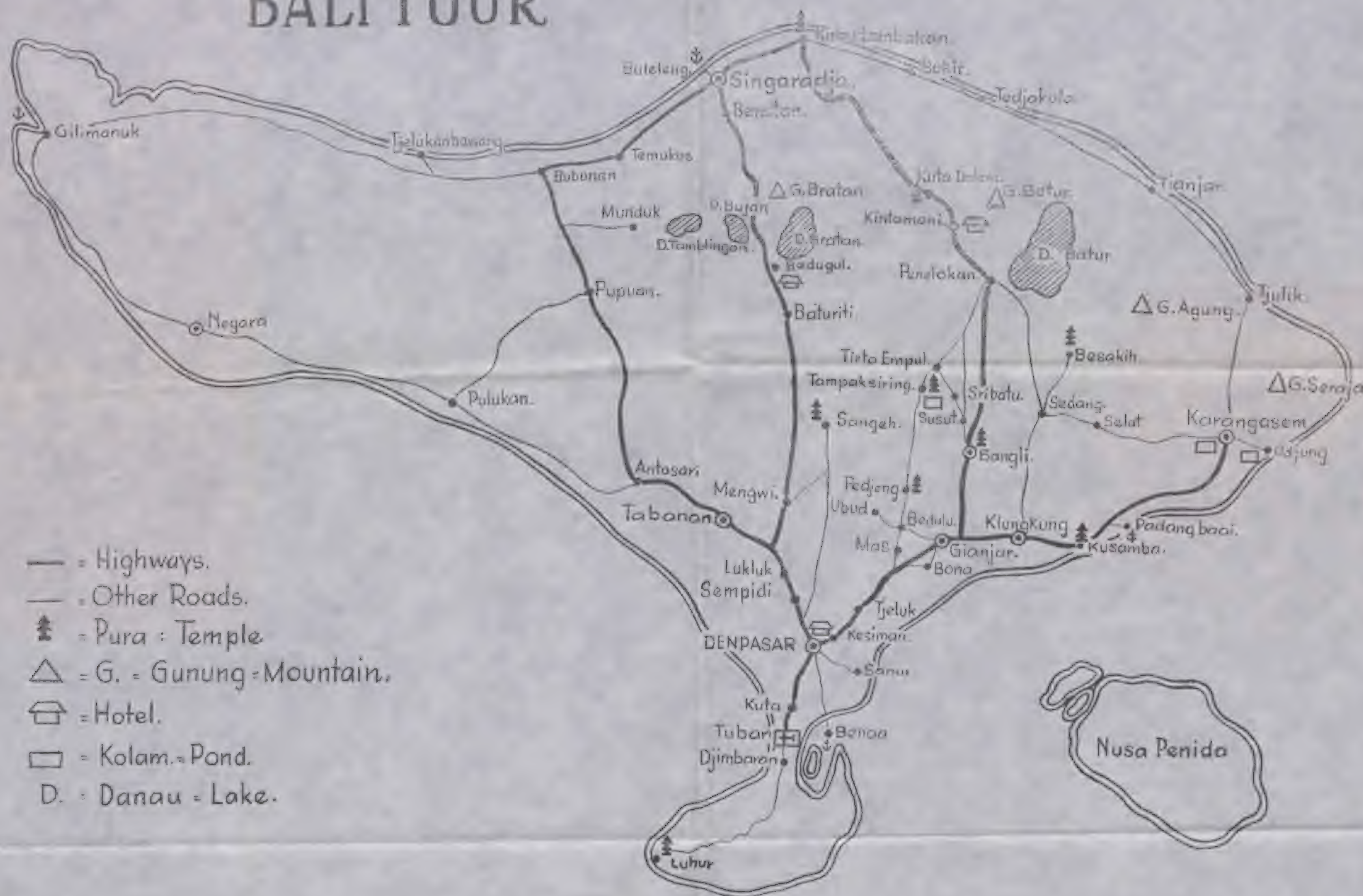
Terophyllus

to be

ngon  
of



# BALI TOUR



## TOURS.

- S S A** From Bali-Hotel to Lukluk (temple), Baturiti and Bedugul (p.m. 12.00 above sea level) on lake Bratan, opportunity for swimming. Back to Bali-Hotel. Duration 4 hours.
- S S B** From Bali-Hotel to Sangah (Holy Forest temple and monkeys) then to Mengwi (temple) and back to Bali-Hotel. Duration 3 hours.
- S S C** From Bali-Hotel to Bona to see Ketchak (Monkey dance). Tickets obtainable at Bali-Tour. Duration 3 hours.
- S S D** From Bali-Hotel by way of Kedewetan and Ubud (centre of painting) to Bedulu (Elephant's Cave). Then to Tampaksiring. Excursion to Gunung Kawi on foot to see the old monastery and King Tombs. Then to the Holy Spring near Tirta Empul and from there back to Bali-Hotel by way of Mas (wood carving) and Tjeluk (silverwork). Duration 5 hours.
- S S E** From Bali-Hotel to Tjeluk (silverworks) Gianjar, Bangli (Pura Keheh) Penelokan (beautiful view on Lake Batur and the volcano of Batur) and Kintamani (1500 m above sea level). After lunch at Kintamani Hotel back to Bali-Hotel. Duration 7 hours.
- S S F** From Bali-Hotel to Tjeluk (silverworks), Mas (wood carvings), Bedulu (Elephant's Cave), Tampaksiring. Excursion to Gunung Kawi (old monastery, King Tomb) on foot. By way of Sebati, Susut, Bangli (Pura Keheh) Penelokan (beautiful view of Lake Batur and volcano of Batur) to Kintamani (1500 m above sea level.) After picnic lunch at Kintamani Hotel back to Bali-Hotel. Duration 7 hours.
- S S G** From Bali-Hotel by way of Tjeluk (silverworks), and Gianjar to Klungkung (Kertagosa, old courtroom). Then by way of Bukit Djambul with beautiful view on the valley of Klungkung and the island of Nusa Penida, to Besakih (Great temple, mother temple of Bali). Then by way of Rendang and Selat to Tirta Gangga (opportunity for swimming) picnic lunch (taken from Bali-Hotel). After lunch to Udjung (water palace of Radja Karangasem and via Kusamba (Goa lawah, Bats Cave), Klungkung back to Bali-Hotel. Duration 9 hours.
- S S H** From Bali-Hotel to Sanur (sea bath at Sanur, Swimming and opportunity to visit Mr. Le Mayeur, painter). Duration 3 hours.
- S S J** From Bali-Hotel by way of Sempidi and Kapal, Mengwi, the by way Kediri to Tanahlot (temple on a rock in sea) Back to Bali-Hotel. Duration 4 hours.
- S S N** From Bali-Hotel to Kuta Beach Djaja, Kuta to visit the painter Agus Djaya. There is a nice beach in opportunity for swimming. Duration 3 hours.



grassy and in places  
badly eroded. Lower slope  
with some secondary woods.

Borobudur stupas - solid  
dates from 778 AD - restored,  
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images used. 504 images  
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Lowlands south and west  
are rice plus village  
complex.

In village complex (E of Wamgon)

Cocos

Bambos

Hibiscus tiliaceus

Mango

Sh. Musa

Ceciba

Averrhoa caroliniana

Muntingia

Saccharum officinarum

Areca

Annona sp.

Artocarpus heterophyllus

Citrus spp.

breadfruit

Manihot

Aceras

Tea

Psidium

Albizia sp.

Leucaena

Glinicidia

Cassia

Tecoma

Tamarindus

many ornamentals

Canna edulis

A few km. W. of Wamgon  
and then low range of



limestone hills, mostly in teak. Not heavily grazed. A few villages and banana-maize culture. Then west of this, the hills continue in pasture, small cultivated patches, thickets, rice in ravines, village complex. Some degraded forest on highest steep slopes, but some very steep areas bare. Some teak plantations again, westward, limited areas. This hilly country extends westward some 10 km.

Road gradually gets out of it to south, running parallel to it through low rolling hills in teak, much grazed.

Then about Mawlung a large area of village complex and rice. Coconut plantations on lower slopes.

Then extensive flooded area. Then a low range of hills covered by main forest fields, red soil, then another large flooded area, near Wandegon, this much smaller.

On both sides of Tachimelap is a mosaic of rice fields

and small rounded hill with trees, mostly coconuts, bamboo, etc dwellings, undergrowth, some other scrub-covered area. Picturesque landscape. Gradually the proportion of rice becomes less, that of hills more; the hills fuse and, then, there is a ~~predominantly~~ predominantly upland landscape with some rice here and there.

Toward Lanet the country is mountainous, volcanic, with spectacular rice terraces below, shifting agriculture on higher steep slopes, little forest left but thickets in ravines. Arenga common. Many ~~are~~ trees flowering. Does not appear to be ~~monocarpic~~ monocarpic at least has a number of axillary inflorescences at once male below. How long this country is not clear, but Kosterma says indefinitely. Many trees in bad shape, some dead, but no correlation some flowering half way down trunk. The



black sheath fiber  
is said to be used to  
line septic tanks, to wrap  
holes which are in earth,  
etc. as it resists rot  
and termites. Also used  
to make rope, esp. for tying  
roofs - very strong. Fruit  
eaten. Sap used for sugar  
making. Very little  
used for toddy. Fermenta-  
tion prevented by smoking  
bamboo collecting containers.  
Coconuts very rare  
here. 3 palm trees seen at  
3400', several others nearby,  
badly attacked by Dryopteris.

Volcanoes bet. Garut and  
Bandung cleared and under  
cultivation to summit.

*Phuchea ~~crucifera~~ indica*  
commonly used as hedge.  
*Albizia julibrissin* curcas.  
A small bamboo more  
rarely.



Jan. 2 - Bogor

planted in gardens

39795 *Endiandra bassii*

5

3 96 *Pseuderanthemum*5 97 *Hura crepitans*5 98 *Hura*

large spreading tree,  
flowers white, somewhat  
fragrant; leaves slightly  
aromatic when crushed.  
small shrub, leaves  
green with dark purple  
veins; corollas white  
with purple dots near  
center.

spreading tree, male  
and female flowers ~~red~~  
dark red; the male spike  
cylindrical, with two  
whorls of ~~stamens~~ flowers  
each.

spreading tree; male  
and female flowers  
white; male spikes  
compressed ~~in the direction~~  
~~of the length~~ parallel  
with axis, flowers  
arranged spirally, many;  
edge of ~~lobes~~ of stigma  
of female flowers deeply  
lobed.



Jan. 5. <sup>near</sup> Bogor. ~~The~~ <sup>Tjiogrey</sup>  
site of proposed addition  
to the botanic garden.

Rolling hills with  
rather deep dark brown  
soil, volcanic ash cinder  
Deep ravines with  
water and woods or  
thickets of bamboo,  
miscellaneous trees.  
The high ground is  
terraced, some in *Manihot*  
some in grass, *manis*,  
etc. Said to be former  
rubber estate. Perhaps  
600 m. alt. or more. 700 acres ±  
on gradual slope above  
Bogor.

Some coconut trees.  
Coll. seeds of a *Poinsettia*  
fr. *Breusel* ?  
Pieces of tile in soil.  
Some young rubber  
some rice, some bananas.

Jan. 9 Darwin - Draining  
rain, said it have been  
raining from Monday till today,  
Thursday.

The area around Darwin  
is green, open forest of rather  
small trees, mostly *Acacia*.  
In town a typical tropical  
assortment of ornamentals:

*Allamanda cathartica* v. *bonariensis*  
*Calophyllum inophyllum*  
*Polyscias tricochleatus*  
*P. guilfoylei*  
*Delonix regia*  
*Pseuderanthemum cantharidis*  
*Polyscias frutescens* var. *filicifolia* ?  
*Polyscias pinnata* ?  
*Mussaenda frondosa* var. *off.*  
*Thevetia peruviana*  
*Plumeria rubra*  
*Ficus* sp.  
*Antigonon leptopus*  
*Lawsonia inermis*  
*Bougainvillea spectabilis*  
*Catharanthus roseus*  
*Acalypha ornata* var.  
*A. hispida*  
*Jatropha podagracea*  
*Nephrolepis* sp.  
*Synedrella nodiflora*  
*Leindorffia aurea*  
*Euphorbia pulcherrima*  
*Sansevieria rostrata*  
*Manihot esculenta* var. *variegata* var.



Prevailing vegetation around Darwin is a seasonal open forest, varying toward savanna, of two species of *Eucalyptus*.

*Buchanania*, *Terminalia edulis*, *Grevillea* sp. *Pandanus* spp., with *Cycas media* rather common and *Devista humilis* rare. The ground cover is tall grass. This is burned every year.

Locally, with no obvious topographic difference, is a type of monsoon forest, densely tangled with vines, difficult to walk through. Stature about 15 m. In dry season the majority of trees and most of undergrowth species lose leaves, but some for only a short time. Burned every year.

Patches in vicinity of Darwin being destroyed for subdivision golf courses, etc.

Mangroves common along coast, but growing on rock terraces exposed at low tide. Terraces cut in a peculiar rock called chalks locally. A bedded breccia. *Cerisops* *luminosa*

*Phyllanthus combolias*  
very common  
introduced

in parts seen, but a white flowered *Bummitzera* common, *Pemphis aculeata*, *Aegiceras*, *Forneratus*, *Abocennia*?, etc. Really swampy places seem mostly almost pure stands of a shrubby *Salicornia*. *Hippomane manzanilla* occurs, doubtless introduced.

Along rocky shore and top of beach thickets of various species, with *Leaevola sericea*, *Cordia subcordata*, *Guettarda speciosa*, *Capparis* sp.?, *Grewia* sp. *Hibiscus tiliaceus*, ~~*Thespesia*~~ *Thespesia populnea*, *Exocarpos latifolius*, *Alstonia* sp.

On beaches *Sporobolus pes-caprae* sp. *brasilienis*.

*Passiflora foetida* with orange fruit common but segments of bracts scarcely interwoven.



*Caesalpinia percheraniana* (yellow)  
*Cocos nucifera*  
*Acalypha marginata*?  
*Clitoria ternatea*  
*Plumeria obtusa*  
*Quercus indica*  
*Tamarindus indica*  
*Lamanea sarnae*  
*Musa* sp.

labels  
 1959

Jan. 8 - Darwin, N.T.  
 (Myrt.)

39799 among mangroves on rock  
 substratum covered by high tide

39900 *Exocarpus latifolius*  
 In thickets just back of beach

01 *Borreria*  
 abundant in open forest  
 and in disturbed places

02 *Stachytaraxis*?  
 common in open forest.

03 *Cassia*?  
 common in open forest

Jan. 9 - Alice Springs, N.T.  
 around airport, on flat silty ground

04 *Borreria*

05 *Eragrostis*

shrub 2 m. tall, aromatic,  
 flowers whitish.

yellowish green shrub  
 2 m. tall, ripe fruit  
 turning dull orange,  
 receptacle swollen.  
 heads lavender blue

flowers with limb white,  
 tube yellow.

flowers yellow, almost  
 or quite actinomorphic.

prostrate, leaves pale beneath.  
 small tufts, culms  
 almost erect.



Jan. 9 - Trip by air from Darwin to Adelaide - DP-4, left side. <sup>at 7:20</sup>  
 Raining hard. Sea very rough, about 25 lines of breakers, water muddy. Considerable mangrove <sup>marsh</sup> ~~forest~~ of Darwin in a small bay. also <sup>3</sup> small estuary systems ~~south~~ of the air field and a large one south of Darwin filled with mangroves.

7:30

Clouds cleared away, from a small area along a muddy stream. Low hills trending parallel to stream - wooded, locally densely so. Bare ground along bottom lands, becoming grassy farther south. Traces of old channels, represented by strings of ponds. Some bare spots. Then complex semi-open country - flat areas in grass, slightly elevated parts savanna to open forest locally. Ponds, probably ephemeral, very muddy, abundant. Then

7:35

country flattens out more and grass and savanna are more general with gallery forest along streams. Ponds less common. The grassy areas are green but the savanna is thin steppe-savanna, with the

reddish substratum coloring it somewhat.

7:39

Country generally rolling, green, mostly savanna, only the highest areas reddish. Some large ponds look blackish, with dead or leafless trees growing in them. These trees really not leafless but somewhat so.

7:43

Hills more prominent, with open forest, ravines grassy. Some higher hills to left in middle distance then closer, irregularly well

7:45

wooded, some savanna, quite green, on slopes away from course (cont). Then flatter savanna locally reddish locally green, with many meandering streams. Then slightly rougher country, with thin savanna, locally green. Then clouds.

7:52

Same, but more hilly, savanna mostly thinner, some open forest locally. Clouds.

7:57

Rolling, green savanna or thin open forest.

7:58

A band of low strike ridges trending back and left from course, quite wide, shallow dip, thin root and almost no grass.



- 2:00 Then hills with <sup>dark green</sup> savanna, rocks showing locally. Rocks a dull red-brown color. Clouds.
- 3:02 Approaching Katherine, mostly cloudy. Thin open forest, some bright red cultivated fields.
- 3:04 Thin savanna around Katherine air strip. Some areas quite green. Areas of very rocky plateau, apparently over-grazed and wind eroded, with thin savanna. Shrubby vegetation denser in ravines and in the network of joint cracks. Lower areas with open forest and grassy patches, green varying to savanna. Gallery forest along river. Soil very red where disturbed. Numerous ephemerals (?) pools. Rocky ground. Conical termite mounds prominent and abundant locally. Ephedra & a few bodachione along air strip at Katherine - open forest of *Eucalyptus*.
- 4:43 Left Katherine. Extensive open forest. Thin grass ground cover. Some rocky spots.
- 4:46 grass under trees thinner, soil red. Clouds.
- 4:50 Thin savanna. Clouds.
- 4:57 Thin forest to savanna, almost no

- ground cover. Country almost flat. Clouds.
- 9:04 Same but even sparser and drier; shallow ravines meandering through slightly rolling land. Clouds.
- 9:11 Thinner forest, mostly savanna, or desert savanna. Soil red.
- 9:27 Apparently desert grassland or thin shrub desert with patches of dense dark green scrub or forest. View not adequate. Clouds.
- 9:29 Patchwork of sandy desert, savanna and forest. Clouds.
- 9:31 Forest becoming more predominant but visibility poor.
- 9:35 What appear to be several large dry lakes, surrounded by an uneven stretch of open steppe-forest. Patches of thin grass or shrub savanna.
- 9:40 Another large dry lake, <sup>gray</sup> very sparse shrubby vegetation. Curious very pale dendritic drainage pattern leading to another dry lake farther to left. Lake gray and area ~~is~~ immediately adjacent is bright red. Shrub desert. Road across lake is white. Red part is



apparently debris fan slope, very low. Several round pits with water around edges of lake. Far side of lake has a sandy strip.

9:59

Evidently the red sand from this side scarcely blows out onto the lake bed, but there are very small dunes a mile of white sand on the lake bed. Then a considerable strip of small ripple-like dunes. Lake becomes more vegetated, more predominantly dunes, still very sharply separated from the red area, both of these with somewhat of a patchwork of vegetation, a very curious pattern, possibly due to man, but very difficult to explain. Then some rolling lighter red land with abundant pools of muddy water.

Then an irregular patch of red and pale gray areas, some with open vegetation, others with almost nothing. Clouds.

10:07

A red desert with irregular small patches of denser vegetation. Apparently approaching ~~Alice Springs~~ Tennant Creek.

10:09

Vegetation becoming somewhat

denser, savanna-like but still desert. Scattered small yellow-green trees.

10:12

Some very thin desert-grass, substratum a lighter red. Slightly more grassy as Alice Springs is approached.

10:14

Low rounded strike ridges at about 70° left of course.

10:15

More vegetation in depression between them. ~~Shallow~~ dendritic gully system with more vegetation.

10:20

Some small flat-topped erosion remnants.

Then somewhat ~~open~~ vegetation, but irregular. A dark scrub locally.

10:25

Then locally shrub-savanna. Bluish patches of dwarf scrub. Erosion remnants darker brownish red.

Gallery scrub along dendritic gully system. Mosaic of ~~open~~ steppe-savanna and desert or desert grassland.

10:27

~~Tennant Creek~~ ~~Alice Springs~~ a small settlement of a few dozen houses.

Dark scrub and many red erosion remnants north of air strip. erect cylindrical termitaria abundant in green open scrub and shrub savanna around fields.



*Plagiodon  
obtusifolius  
Callitriche  
rosea*

Tamarix of Aphylla, and  
Arbinsonia aculeata planted  
here, also the lemon yellow Casuarina  
that we had at Turlock.

On the flat-topped red  
erosion remnants are a  
few scrappy ~~small~~ small  
trees, ~~possibly~~ <sup>probably</sup> Eucalyptus,  
and on slopes a gray low  
open scrub, probably Atriplex.

10:57 Left Tennant Sp.

Savanna with Tridens?  
clumps - circular, dead in center.  
Low gray-green Acacia?

Then mosaic of patches of  
savanna with desert, very red.

11:02 Then rather even desert  
with vegetation in a  
somewhat oriented "ripples"  
pattern, possibly small  
fixed dunes with bare red soil  
between them. Patches of even  
thin desert grassland interspersed  
with ripple pattern. Entire  
area red.

11:05 Slightly more relief. Ravines  
with vegetation.

11:09 Mosaic of red and slightly  
green areas, gallery scrub  
in ravines, areas of "ripples"  
scrub desert. Patches of green  
along bottom land of main  
stream paralleling course.  
11:11 Some very bright red areas

also some lighter old rose  
pink areas with small  
patches of paler sand, some  
dull greenish red areas.  
Some of the boundaries  
here are regular enough  
to have been fences - possibly,  
this pattern may be  
in part due to degrees of  
overgrazing.

11:15

Very low broad strike ridges  
transverse of course, with  
ravines more or less perpen-  
dicularly dissecting them, but  
very shallow, with scrub  
in bottoms, little vegetation  
on higher parts.

11:17

Low rolling terrain - reddish,  
desert savanna, patches  
of dark open scrub, then  
mosaic of <sup>small</sup> patches of dark  
scrub and <sup>lighter</sup> grass. Scrub  
apparently collects sand. All reddish.

11:21

Patches of scrub scarcer.

11:24

mostly thin desert grassland.  
Elongate somewhat meandering  
depression more vegetated  
than surrounding grassland,  
more scrub patches.

11:25

Patches of almost bare red  
sand(?) on hard soil.

11:26

Following a stream-bed  
with gallery scrub and  
a flood plain of almost bare



light red soil. Rather dense desert grassland on flat terrace on both sides; to right of this a range of low hills, probably a strike ridge with very sparse vegetation except in ravines.

11:25 Irregular mosaic of areas of desert savanna, desert grassland, and almost bare areas, with meandering stream bottom-land with denser grass, still thin.

11:30 shrub savanna, still red.

11:32 Range areas of desert grassland with eroded higher spots, denser vegetation in ravines, trees scattered along larger one and along stream beds.

This has all the appearance of a formerly badly overgrazed range, abandoned long enough for cattle trails to disappear.

11:35 Small low sedimentary plateau on left, thin grass, ravines radiating down sides, with scrub.

11:37 Low erosion remnants with some rock. Then shallow complicated dissection. Sparse desert grassland and eroded bare areas.

Shallow vegetated ravines. Somewhat greater relief.

shrub desert with patches of desert grass.

White spots on the red that may be prospect holes. Then more or less continuous red shrub desert, locally rather dense.

11:43 Range area of flat desert grass with shrubby patches, gradually changing to steppe.

11:52 Areas with slight relief, shrub desert, flat areas, apparently lake bed, steppe. Shrubby areas may be small sand dunes, perhaps sand collected by bushes.

11:59 The lake bed is extensive. At other side of it long dune ridge with concentric bands of shrubs. (Acacia). Between ridges bands of steppe. Ridges bare and red except for ~~steppe~~ shrubs. Steppe mostly gone, dune pattern complex (no assurance that these are dunes).

12:01 Scattered dark low mountain mass, covered by open scrub or scrub desert, bare red pans and flats between them with only scattered shrubs, perhaps small trees. Flying at low alt., very rough.



12:05

Continuous low dark hills middle distance to left. red flats closer, with scattered shrubs or small trees. Then scattered low hills.

12:08

Badly eroded area, trees & cines, possibly gullies but pattern very strange possibly concentrically parallel dune ridges and valleys - probably is, pattern very extensive (Kodachrome).

12:10

12:11

Stream system with trees along streams. Then more of same pattern (photo, brown).

12:12

Apparently approaching Alice Spr. More ~~low~~ hills.

12:14

Open gallery forest along stream. arborescent desert on low hills. High hills or Mts. in distance on both sides.

12:16

Alice Springs, a fair sized town, roofed village, with a sharp, steep, <sup>very</sup> straight ridge just beyond it. then another, standing muddy water between small flat-topped trees abundant. Very muddy reservoir. Then very flat salty(?) plain with scattered trees around sinkholes. No water.

Around airport *Tamarix* sp. (with spirally twisted dioecious spikes), *Melaleuca* sp., *Pariana* sp. *Patunia*. *Catharanthus* roseus, *Kalanchoe* sp. *Citrus* sp. *Cynodon dactylon*.

Hot here but a dry breeze blowing.

12:23

Left Alice Spr.

Some green areas, meandering strips with grass and trees. low open forest, in the plain south of Alice Spr. Airport. Also ~~meandering~~ with ~~the~~ narrow strips of open forest. Mostly arborescent desert and desert grassland.

12:27

A few patches of steppe savanna.

12:29

A low range of dark brown hills transverse to course.

12:30

Then a mosaic of patches of desert, steppe savanna, patchy brown hills with scattered shrubs or trees, red sand dunes.

12:31

Low hills with bluish grass or *Atriplex* and scattered trees, patches of red desert hills.

12:32

Bluish hills doubtless *Atriplex* with patches of red sand dunes (31) and flats between hills.

12:33

A series of strike ridges transverse to course with gaps in them. Much red



bar. ~~low hills~~ desert, very small blue hills with *Atriplex*. Some small clumps of darker large hills. Much geology showing, if there were only time to interpret it.

1-111 Large area of almost bare red desert, with only a few narrow strings of trees along ravines.

1-112 A series of bright red narrow almost straight parallel dunes, parallel with course, is left. Interrupted by hill but still continues on flat areas. They stretch into the far distance where they become *Atriplex* (?) flats. Closer at hand in desert savanna.

1-113 Become anastomosing network (red) strikingly red against blue of *Atriplex* savanna.

1-151 Not so anastomosed anymore (hot)

1-152 Almost no dunes, or mostly stabilized and hard to see. Thin rather red shrub desert.

1-153 Scattered small eroded remnant hills with sulfur yellow tops about a slight rimrock. Then more parallel dunes, this time at a slight angle toward course. Ending on a vast shrub desert.

Plain (photo)

2-01 Shrub vegetation getting sparser and somewhat arranged in lines parallel with the dunes, perhaps stabilized dunes or more likely the bottom of the depressions between them. (photo)

2-04 No more dunes - a flat desert plain with very little visible vegetation, practically none except along faint watercourses. Landscape not very red any more.

2-07 More parallel dunes or otherwise lumpy landscape. Little vegetation except scattered shrubs along the same ridges, fewer between. Vast area.

2-10 Dunes change from red to pale

2-17 No more dunes but a vast pale plain with almost no vegetation except strings of trees & shrubs along dry watercourses.

2-25 This is almost a quite a bare as before, pale buff in color.

2-30 Locally splashed with dull purplish.

2-39 Towards parallel dunes at about a 45° angle backward from course on a level plain. Scattered shrubs between dunes.



237

Dunes have become redder,  
~~and~~ closer together and much  
broader. Ground between  
them almost covered.  
Very little vegetation.

240

Dunes anastomose and  
lose their parallel alignment  
become a vague irregular  
sea of dunes. Some vegetation.

241

Crossed a broad braided  
series of ~~dry~~ water-courses  
outlined by vegetation.

242

A broad plain colored like the  
painted desert, no vegetation  
except in ~~some~~ <sup>a few</sup> dry  
watercourses. (hot)

253

Crossed a broad white dry  
watercourse with a few  
lines of vegetation.

Then more painted desert  
very bright hematite color.

256

A tributary watercourse ~~has no~~  
with prominent lines of vegetation  
dark green small trees. Then  
another. ~~Then another~~  
This does not join the main  
one crossed at 250 but flows  
into Lake Eyre (?) <sup>goddamn</sup> separate  
still another and another.

259

Conspicuous vegetation  
in the lower courses of  
these before they come out into  
the white salt (?) flats of which

probably must be <sup>type of</sup> Lake Eyre  
tawny flats with white  
patches.

303

Crossed meandering stream-  
course with stretches of water  
in it.

306

A vast dry white lake  
bed. A very sparse  
vegetation of small bushes  
on tawny margins but  
apparently nothing in the  
bed itself.

312

Very odd streaky clouds  
of white dust? evidently being  
driven across lake bed more  
or less transversally to course (hot)

315

This white flat is probably  
the most absolute desert  
on the face of the earth. Not  
a sign of visible vegetation.

317

An island or area of slightly  
or a peninsula of slightly higher  
tawny land, then more salt.

319

Shrinking along the west  
shore. Tawny, little vegetation.  
Across lake is a great series  
of subsidiary smaller lakes  
to the west.

326

End of main body of lake.  
Many smaller ~~detached~~  
pools, all white and dry, some  
connected by channels, most  
to the lake proper. A few  
dunes and small bits of



vegetation. Mostly plain, rather wooded watercourse entering southward. Otherwise a tawny vegetationless plain - gallery of open forest along watercourse, tawny plain otherwise. Little sign of vegetation.

A series of beautiful strike ridges cross course.

A horse shoe rather hairpin shaped series in distance to left.

more strike ridges, these more vegetated than others, though still desert.

Then hilly land with patches of forest in some small valleys.

Strike ridges form a very interesting pattern, not altogether understandable as ridges seem to intersect. Fair areas of open forest on lower slopes.

Scattered cultivated fields in thin grassland, a few patches of forest and savanna. Some dry farming of flatter areas, grass steppes and steppes savanna on low hills.

But a couple of patches of dense obviously planted forest. Green ravine bottoms.

Low in flower patches dark purples

red.

4:55 Mostly under cultivation now except a strip of patches varying from <sup>steppes</sup> savanna to open forest along left of course, on slightly hilly ground. Some fields green, some plowed, some yellowish brown.

4:57 Long town. More savanna and open forest, even some closed forest on low hills.

5:00 Strips of forest in distance. Scattered patches of steppe savanna and apparently steppe or dry pasture close by, otherwise dry farming.

5:04 Range of very low hills roughly paralleling course mainly steppes and steppes savanna. Flat ground all farmed.

5:07 Farms here have <sup>very</sup> small "woodlots" or patches of open forest. Otherwise all cultivated. Very flat country.

5:12 Another town or middle distance to left. The tiny woodlots seem to be the rule here. Various sizes but all small, various densities but mostly open forest.

5:14 In distance to left a hilly partly wooded region. A town below, up above.



5:17

Facing altitude.

Trees along ravines and watercourses.

Circling, sea now on left. What appear to be mangrove swamps and barrier islands in distance.

4:20

Hilly land mostly savanna, some good forest on higher parts, some patches of scrub on slopes.

## Jan. 10 Adelaide National Park

Open forest of *Eucalyptus camaldulensis*, *E. odorata* understorey of *Acacia* spp. *Casuarina* sp. etc. (photos, also of *eruca* + *brangaroo* in enclosure).On slopes *E. leucoxylon* (photos) with *Hydriceum* (photo) (result of fire).From summit of Mt. Lefty (rocks) forests of stringy bark *E. obliqua*, sclerophyll scrub, changing toward Adelaide to savanna.In forest also some *E. baxteri* and a few *Banksia ornata*. *Excoecarpus cupressiformis*.Marsh of *Leptospermum laurum*, *Prosera*, *Sprengelia* etc. in bottom of draw (photos)

Red photos of birds

Birds! *Cartularia*? common in fields.surrounded by *Eucalyptus obliqua* forest (photos) rather open, but 10-15 m. with sclerophyllous shrub layer almost continuous. Scattered *Excoecarpus*, several genera of leguminous shrubs, *Styphelia*, etc.*Disprognoceratophyllum* (photo) *Protea* spp. occasional.*Leptospermum* dominant in shrub layer. *Hakea* common.Sclerophyllous scrub with scattered *Eucalyptus* above, *E. leucoxylon* in f.g. (photos).Lower slopes, savanna-forest of *E. leucoxylon* (photos) *Acacia*, etc. mostly exotic, on ground.The color of these forests is uniformly a dull dark green. Only the *Excoecarpus* in the understorey is bright green. The shrub layer, otherwise, is also dull dark green. The grass layer in the savanna and open forest, and on grassy flats is straw yellow. This is a Mediterranean type of landscape and reflects a Mediterranean climate - about 4 rainy months in winter, the rest of the year dry. Wine producing region.



Jan. 10 - Trip by air Adelaide to Melbourne. Dep. <sup>1:00</sup> 2:00 p.m. at side. Very low coastline, mostly sand beach, a few very low cliffs to s.e. of city.

Low hills on peninsula east of city covered with savanna, replaced northward by open forest as higher slopes are reached. Small reservoir s.e. of city. Some slopes scrub-covered. Pattern of distribution of forests and open land suggests clearing by man, at least in many cases.

3:06 Rolling country, mostly cleared, with scattered trees. Much of it ~~is~~ apparently in pasture, some cultivated.

3:09 Trees essentially absent from here on, except a few along water-courses and ravines, and in a few areas of apparently rocky soil where there are scattered small trees and some open scrub. Hills mostly dry-farmed, now brown, or where scrub covered, black.

3:13

(Lake Alexandrina)  
Approaching bay - some spots of white soil have open scrub, or some seem to be desiccating pools. Along

3:11 alt bay shore are considerable salt marshes, of strikingly black color, with slight dark green development of mangrove (*Avicennia* only acc. Womersley).

3:16

Around head of bay are extensive brown flat areas, treeless, possibly pastured, with numerous desiccating pools, white, apparently with salt. Back from this black scrub <sup>forest</sup> and dry farmed areas. Interspersed with dry farming areas are brown pastured, thin scrub, and dense scrub <sup>forest</sup> tracts of very considerable extent, mostly on somewhat hilly or rough ground. Perhaps some of this is forest rather than scrub, but probably not. For distance toward coast are extensive wooded tracts, in fact, by far the larger part of the land is in forest. Soil in this region generally pale gray to almost white.

3:24

3:26

Mosaic of dry farming, pastures, and scrub or forest, in fairly large patches continues along coast. Forested area characterized by sub-parallel undulating ridges.



- that may be dunes, but not necessarily, if so mostly very well stabilized by vegetation. Large unbroken area.
- 3:22 In several places the cover has been disturbed and the dunes have become active again.
- 3:26 Area of fixed sand dunes, with thin scrub, rather than thick scrub or forest, and
- 3:35 Partially cleared land, with numerous ~~scattered~~ elongate spots remaining in ~~parallel~~ alignment along course for some distance. To left of plain vast wooded area.
- In middle distance dry farming almost continuous. Most curious brown scrub area with lines, somewhat wavy, parallel but numerous and close together, as though combed. Then more black densely wooded hills.
- 3:43 hilly cultivated land and pasture. In places scattered trees. Some patches of wood or scrub.
- 3:47 Then a broad band of irregular forest or scrub, red. These bands run at about 60° to road, forward to left

3:50

hill.

3:53

Another band of cultivated land, dry farmed, but this with irregular cross bands of forest and hundreds of ~~spotted~~ <sup>spotted</sup> ~~spots~~, some of them white, others gray or greenish. This band very broad. Much pasture with scattered trees. Open gallery wood along meandering watercourse.

Clouds.

4:24

Large patches of forest, some (pasture), and cultivated ground. Forest on rounded hills, very dense, dull dark green.

Jan. 11 Melbourne - street and park ornaments  
~~Eucalyptus~~ sp. *Tristania*? <sup>5 fascicles of stems</sup>  
*Machra pomifera*?  
*Genista* sp.  
*Helianthus altissimus*  
*Merium* sp.  
*Cestrum* (red)  
*Abelia grandiflora*  
*Jacaranda ovalifolia*?  
*Platanus* hybr.  
*Cytisus scoparius*  
*Betula alba*  
*Ficus pumila*  
*Helianthus annuus*.



Collected  
by

79806

07

Jan. 10 - Adelaide, S.A.

slopes of Mt. Lofty

*Sprengelia*?

marshy place

(deg.)

common in shrub layer in  
*Eucalyptus obliqua* forest

Jan. 11 Melbourne (etc.)

*Crataegus* sp.

*Ampelopsis* sp.

*Agapanthus*?

*Ligustrum vulgare*

*Quercus robur* } both

*Quercus* sp. } unhealthy looking

*Salix molle*

*Muehlenbeckia* sp.

*Coprosma baueri*:

*Abutilon pictum*

*Washingtonia filifera*

*Veronica* (Hebe) sp.

*Choriza ternata*?

*Bellis perennis*

*Phoenix canariensis*

*Fuchsia magellanica*?

*Hydrangea*

*Phlox drummondii*

*Prunus* (Japanese red lnd.)

*Lolandra*?

*Phlox paniculata*?

*Pittosporum crassifolium*?

*Fibrousia*

*Delargonium*

*Impatiens sultana*

small shrub

shrub, m. tall, flowers  
deep orange in color.

*Viburnum opulus*?

*Cotoneaster fraxinosa*

*Canna* hybr.

*Callistemon*

*Tagetes* sp.

*Helenium*?

*Poa annua*

*Trifolium repens*

*Viola tricolor*

*Althaea rosea*

*Ulmus* sp. (glabra?)

*Alternanthera versicolor*

*Cedrus libani*?

*Liquidambar styraciflua*

*Fraxinus* sp.

*Populus nigra*: (Lombardy)

*Hibiscus* - like tree, stamens white, no. cov.

*Agathis* sp.

*Eucalyptus* sp.

*Populus deltoides*?

*Arancaria columnaris*? (var. *alba*)

*Morus alba*.

*Pinus* sp.

*Quercus* sp.

*Salix babylonica*



*Dracaena draca*?  
*Aesculus parvifolia*?  
*Quercus biloba*  
*Nedera* sp.  
*Fatsia japonica*?  
*Quercus* sp.  
*Grevillea robusta*  
*Alangium*? *Actinidia*?  
*Gaura* ?? fl. white, fr. <sup>narrowly</sup> ~~fructuous~~  
*Lysiphonocarpus*?  
*Brachychiton heterophyllum*  
*Leptospermum* ??  
*Pinus pinaster*?  
*Plumbago auriculata*  
*Chamaecyparis*?  
*Ficus* sp.

*Carduus*? (artichoke?) common  
 in open fields and vacant  
 lots.

Jan. 11 - Melbourne - Cooma. Car  
 left Melbourne

Mostly dry to faintly  
 green mosaic of harvested  
 grain fields and pasture  
 land with abundant  
 scattered trees. Trees most  
 in pastures - typical saw  
 ranging locally almost to  
 open forest

Reservoir ~~and then~~ surrounded  
 by strip of dense forest, then

a slope with green  
 grass and open forest, then  
 densely wooded rounded  
 hills. The forest on  
 ridges very fine textured,  
 that in ravines coarse  
 textured. A few cultivated  
 clearings on tops of  
 wide ridges and on small  
 plateaus. This forest  
 quite extensive.

3.49

End of forest - now complex  
 hilly country with  
 wooded ravines and  
 steep slopes, otherwise  
 grassy with scattered  
 trees, the grass mostly  
 dry, some small valley  
 bottoms green.

352

Narrow green flat  
 valley bottom with  
 kinky meandering stream  
 with narrow gallery forest,  
 many traces of old beds  
 and meanders.

3.53

A considerable densely wooded  
 range a bit to right.

3.54

Another small valley  
 with meandering stream  
 and incredible series of  
 old meanders for such a  
 hilly country. Then extensive  
 dry hills with sparsely  
 scattered trees.



257

Eildon Reservoir, a very complex, browned valley, in a mostly wooded range of low mountains. Northern arms of reservoir in savanna covered hilly country. Treacherous, wooded Northern tip of reservoir.

3:01

Then rather level & slightly rolling land, savanna, a few harvested grain fields, grass mostly dry.

3:05

Mosaic of dense forest, open forest, savanna, and cultivated land. Some of grass is green.

3:07

Vast densely wooded area, a few small cleared patches, quite mountainous. Dry plain to left of course. Rather rugged mountains to right. A little cleared and farmed & pastured land in a few of the valleys.

The woods on the mountain slopes are slightly open, showing some ground, varying to completely closed in places.

3:11

Same vast ~~area~~ wooded area on right, dry plain but with a few wooded valleys stretching into distance on left, these valleys seem to be the extensions of narrow

cleared valleys in mountains to right.

3:14

A high, very rocky massif, with peaks and ridges of bare granite, ravines and joint cracks wooded, also lower slopes. Said to be much snow in winter, and large skiing resort seen on top of one of peaks.

3:15

Large valley system, with much cleared land, mountains between well wooded. Then another lower mountain mass, solidly wooded.

3:17-18

3:17

Very large reservoir far to left (Hume Res.?) Cleared valley on it. Then vast wooded mountain area, with what appears to be one peak and a high plateau above timber-line in distance to right (~~at Hume Res.~~) typically mountain meadow as far as can be made out from distance. Several other smaller peaks also slightly bare on tops. Some high ridges apparently have scrub on west side, dense forest of dark brownish color on east & northeast.

3:23



- 3:25 A forest fire in distance on night.  
The dark brownish forest seen characteristic of highest peaks. On highest ridge there seems to be a rather open scrub at least on s.w. sides. Also seem to be many bare white trees. Patches of these very conspicuous, probably from old fire.
- 3:30 Semi-open mountain and ridge tops, meadows in small valleys, very notable here. No roads in all this mountainous area.
- 3:32 An apparently new road below, high, semi-open rounded mountain-tops in distance to both right and left.
- 3:34 Passed directly over, very high, very rocky, completely open mountain top with snow patches. Road in valley to right of it.  
Then more rocky semi-open mts. to right. Very high on with snow patches far to left. (Mt. Kosciuszko).
- 3:37 Some small green valley in dry savanna covered hills. Appro. Cooma.

- 3:38 Crossed river.  
Hills with scrubby brownish open forest. Very degraded. Thousands of fallen tree trunks.
- 3:40 Very odd gray plants abundant in open forest on steep slopes.
- 3:41 Park-like country with open grass, patches of open forest. Curious rock outcrops. Some green patches of young grass. Mostly very close-cropped open pasture, locally patches of savanna and open forest.
- 3:43 Passed an air strip. (Cooma) Some small ponds. Circled back. This is apparently typical sheep country, probably badly grazed. Some areas of a coarse bunch grass. Much outcropping rock landed. Photos of degraded open forest. Trees are low, rounded, spreading. Course from here along upper Murrumbidgee R. to Canberra. Left Cooma. Rock outcrop abundant, especially where there are trees. Quite a few fair-sized ponds, some full, some dry. Dryones have holes on opposite



sides.

4:19 Ranges of low hills with open forest, grassy valley between.

4:20 Meandering stream with clear water winding through hills then crossing into valley and joining river. On other side of valley, tonight, an extensive wooded area of low hills.

4:21 Green fields on river flats. Some serious gullying on sides of valley, but stream is not muddy, at least now.

4:25 Hills covered by savanna, look badly overgrazed.

4:26 Hilly country, mosaic of open forest, savanna and overgrazed grass, some nearly closed forest on rougher areas.

4:28 Fairly high wooded mountain parts left, a rocky rugged sparsely wooded range on right, becomes less rugged and more densely wooded as we follow it.

Valley below pasture and savanna. Badly gullied.

4:31 Hills with very degraded forest and savanna.

4:33 Grassy valley with many small artificial ponds. Then extensive savanna, covered

hilly area.

4:35 A fair sized town surrounded by low wooded hills. Canberra.

Jan. 12 - Canberra - Sydney  
Left side of plane

4:35 left Canberra.

4:37 Stretches of rather tall open forest, other similar patches, otherwise savanna with enormous amounts of dead timber - possibly from fire, some stretches with all trees dead, some rather bad erosion. Patches of open forest are angular, suggesting that the dead trees may be from clearing operations rather than fire.

4:38 Large lake or reservoir with rather muddy water, very thin grass on flats along shore, no trees except where hills or cliffs come down to shore.

then flats of grass, with patches of savanna and fresh gullies.

4:39 Hills to left, partially wooded. Grass very thin brownish green.

4:39 A couple of large ponds.

then grass with patches of forest and savanna, some







Jan. 16 - Between Koko Crater  
and Malapuna Pt.  
roadside in ~~low~~ <sup>dry</sup> low  
Prosopis forest.

39808

2

*Gossypium tomentosum*  
common locally

3

09

*Euphorbia heterophylla* L. Mt. R. L. Dresser  
occasional

*Gossypium tomentosum*  
still persists for a few  
hundred yards along  
the road and somewhat  
into the forest. It ~~attains~~  
attains a height of two  
meters, and is definitely  
woody. The flowers  
open wide in the morning  
(about 8 a.m.), have ~~a~~ protruding  
coherent stigmas, somewhat  
bent to one side.

The plants are mostly  
badly infested by small  
mealy bugs tended by  
tiny ants, and the most  
heavily infested plants  
are dying back from  
the tips. Also some of the  
plants seem to have a  
mosaic disease which  
makes the leaves become

## MISSOURI BOTANICAL GARDEN

"SHAW'S GARDEN"

2315 TOWER GROVE AVENUE

ST. LOUIS 10, MISSOURI

PROSPECT 9-5567

February 9, 1959

Dr. F. R. Fosberg  
Pacific Vegetation Project  
% National Research Council  
Washington 25, D. C.

Dear Ray:

Thanks very much for the Poinsettia seed.  
They are both the angular, coarsely tuberculate  
seed of *P. heterophylla*. As you note, the  
pedicels do elongate and straighten as the  
fruit mature. This gives the capsule a  
relatively clear shot for its explosive  
dehiscence. I am very glad to get the seeds,  
though I'm not sure that I'll try to grow a  
Poinsettia garden this summer. I want to spend  
at least a month in Mexico, collecting over  
in the west, and by the time I return from  
Montreal, the summer will be nearly gone.

I have been somewhat side-tracked lately,  
but I do intend to write up my poinsettia  
data one of these days.

With best regards.

Sincerely,

Bob



Jan. 16 - Between Koko Crater  
and Makapuu Pt.  
roadside in ~~low~~ <sup>dry</sup> low  
Prosopis forest.

39808

*Gossypium tomentosum*  
common locally

3

09 *Euphorbia heterophylla* L. Mt. R. L. Drenth  
occasional

*Gossypium tomentosum*  
still persists for a few  
hundred yards along  
the road and somewhat  
into the forest. It ~~attains~~  
attains a height of two  
meters, and is definitely  
woody. The flowers  
open wide in the morning  
(about 8 a.m.) have ~~a~~ protuberant  
coherent stigmas, somewhat  
bent to one side.

The plants are mostly  
badly infested by small  
mealy bugs tended by  
tiny ants, and the most  
heavily infested plants  
are dying back from  
the tips. Also some of the  
plants seem to have a  
mosaic disease which  
makes the leaves become

shrubs up to 2 m. tall;  
flowers light yellow, open;  
stigmas almost white.  
lactiferous herb, stems  
thick, no red spot at  
base of involucral leaves,  
scarcely paler. (note for Drenth)

venulose and change  
shape, becoming more  
deeply lobed and drawn  
down at base. Seeds  
collected for genetic  
studies.

Leaves of *Cordia* cut  
with almost complete petioles,  
and kept in water in a  
"pin frog" for some weeks  
had developed roots and  
were in a completely healthy  
condition. Roots radiated from  
cut end of petiole.



Jan. 20 - Flight San Francisco  
to Chicago, left side of plane.

East of hills back of  
Oakland is a very considerable  
area that is not cut up  
for real estate. There are  
grassy pastured hills,  
fair areas of *Artemisia*  
*californica*, some invaded  
by trees, and some good  
patches of low open or closed  
forest. Roads make much  
of this quite accessible.

East of this, Mt. Diablo  
is more rugged and rocky,  
apparently has some  
true chaparral, some  
forest, and much rocky  
steep grassland, as well  
as some gentler grassy  
slopes.

Valleys filled with fog.  
San Joaquin mostly covered  
by fog, a few spots open.

Foot hills of Sierras covered  
by fog, up to the top of largest  
chaparral areas. From there  
on is very largely a  
mosaic of large areas of  
open forest with smaller  
areas of chaparral, the  
boundaries of these often  
not sharp, flat valley  
bottoms cleared. Some areas

logged. Only well up in  
the mountains are  
areas of closed coniferous  
forest, these varying  
locally to open forest and  
chaparral. Open slopes  
with scattered trees  
more and more common  
upward. A little scattered  
snow in the lower open  
forest, more in the closed  
forest; upper mosaic of  
closed forest, open forest  
and open slopes deeply  
snow-covered. More  
and more open snow  
and rocky ridges and  
slopes upward, till country  
is essentially bare with  
patches of open forest in  
valleys. Much bare rock.  
Snow not especially  
heavy. Some high granite  
domes and ridges with  
almost none.

Eastern slopes have almost  
no snow.

5:45

By arrival lake to north, some  
forest south and a little  
west of it, with considerable  
snow. Otherwise, along  
course south and southeast  
of lake very little snow, large  
gentle slopes of sage-brush,



scattered junipers (?)  
on sides of ravines  
and canyons.

then considerable areas  
of rather dissected  
slopes and low mountains,  
the upper parts of which  
are covered by open coniferous  
forest, a savanna, of low  
trees, lower slopes ~~to~~ sage  
brush, & some alluvial  
fans covered by sage brush.


9:55 More hills with open forest  
and savanna. Then what  
seems to be desert with  
only very sparse vegetation,  
quite dissected, varicolored,  
not even the low mountains  
showing any visible vegi-  
tation from this altitude.

9:55 Several dry lakes with  
broad alluvial fans leading  
down to them. On the fan  
south of dry lake nearest  
course what appears to be  
old partially stabilized  
barbans, horns pointing  
northwestward. A highway  
crosses this fan. These dunes  
would be worth investigating  
on the ground.

9:55 Another small dry lake <sup>alluvial</sup>  
immediately to left of course,  
with what appears to be clumps

of vegetation holding small  
dunes or tumuli on fans  
around it. Very rocky  
hills or low mountains  
east of this, with scattered  
junipers (?).

10:01

Then broad valley,  
dark areas outcropping  
from fan debris covered  
by scattered whitish spots  
that must be prospect holes.  
Slightly hilly land,  
then another enormous  
valley with great fans,  
an  shaped air field  
but no town at all on this  
side of course. Large strips  
of transversally arranged  
dunes. Very little vegetation  
evident in all this country  
except on another fan  
sparse sage-brush.

10:04

Erosion remnants protruding  
through alluvium.

Then bare low mountains,  
and alluvium filled  
valleys, dissection not  
very sharp. Rugged  
high mountains far to  
north.

10:08

Wide valley, some patches  
of dunes.

10:10

Low mountains with scattered  
trees, much higher and woodier  
to north.



Then another broad flat valley. A highway (or railroad) crossed the low pass in the mts. and the valley.

Then much bare irregularly low mountains and dissected country with mesas, alluvium-filled valleys. What appears

10:17 to be a dune field immediately along course, with a large wash running down to

10:16 a large dry lake somewhat to north. South of it rather rugged mountains with open coniferous forests on slopes, a little snow. Then

much higher mountains. ~~Further north in the mts. on the left~~

10:15 Mountains with some woods to north, wide alluvial fans along course. Some fan slopes thickly spotted with pale areas - prospect holes? or what?

10:14 A wide valley with a stream with water and some small dams, rather extensive areas of marsh, extending far to north, running southward.

Rather low mountain, wooded to north, to east of

this valley, then a sandy basin. Then a low mountainous area with scattered trees, denser with a little snow on higher north slope.

10:25

Another wide valley. Then a near the Nevada-Utah border. Isolated small

ranges in generally alluvium-filled area, some of these rather high and well forested, a little snow on north high slopes. Crossed a

10:24

fairly high range with another considerably higher to north.

Ahead alternating ranges and alluvium-filled valleys with dry lakes, for some distance. Valleys bare, scattered junipers on dissection, mountains sparsely to moderately wooded. Very little snow.

10:22

A couple of small lakes with water, in valley to north. Otherwise alternating bare flats and sparsely wooded mountains.

10:21

Some higher peaks with pretty dense forest, a little snow. The forest here



evergreen. Immediately eastward some deciduous forest patches.

10:45

To north a large valley. Along course and ahead very mountainous country with patches of good coniferous forest, some snow. Some cloudiness more so ahead. Deep

10:47

desert valley with a small flowing river and to north, a small town or two, surrounded by high mountains, some very colorful, mostly bright red eroded mountain wall to north.

10:49

Solid clouds.

10:51

A cultivated valley with a small closely meandering stream. Then more clouds.

10:54

Mosaic of woods and open ground, much snow.

10:56

A wide valley with very steep walls and rather dissected bottom out into red <sup>and orange</sup> rocks. Almost no vegetation.

10:58

Spectacular erosion, mesa land, buttes, canyons, stretches away to north. A thick red bed with yellow above and below. Eastward

10:01

very dissected land, pattern complex but less spectacular. Then some pretty spectacular erosion again. Vegetation very sparse - in rougher spots some junipers or pinyons.

11:02

Wide bare desert plain. Then clouds.

11:05

Bare or similar plain, no visible vegetation, ground mostly reddish.

11:07

Crossed a large river with a little water and much dry bed, this conspicuously white. Tributaries also with white beds. Perhaps? Eastward this bare plane rather irregular. Then clouds.

11:30

Clouds thinned out. Land is entirely under cultivation except for numerous dendritic gully systems which are sparsely to densely wooded.

11:37

A few small woodlots.

11:40

A fairly large city on a southeastward running meandering river.

11:42

No snow at all in this whole patchwork area. Large meandering river becoming almost parallel with course. Then crossing St. Jan.



1.43

A little snow in ravines. Max snow visible far to north.

1.44

Gullying more intricate and covering more ground but not very fresh. Rather little level ungullied land. Gullies, though, not much wooded and generally cultivated. Gallery forest along rivers and streams.

1.50

Becoming more snowy. Ground covered with thin snow. Conspicuous gallery forests along rivers to north, flowing eastward.

1.56

Some very complicated meander patterns in a wide frozen river, crossing course toward S.E.

Then gently rolling topography showing ancient dendritic gullying. Even small streams, mostly slightly incised, tightly meandering.

1.59

Wide frozen river, running generally southward. ~~Interfluves~~

Interfluves of tributary systems showing very gentle relief.

Tributary systems dendritic. Main streams wooded. Otherwise ~~land mostly treeless~~ except around farm houses.

Small incised streams have been mostly channelized.

Leaving very complicated dry meander patterns in agricultural lands.

Bottom lands of larger streams or rivers wooded. Meandering conspicuous.

2.07

Crossed Mississippi R.

Very complicated system of channels and islands. A dam to north, probably on below course, also.

2.08

Series of parallel low ridges running east from river.

2.09

What seems to be an old, extremely flat bottomland with bluffs, but with no river course, running southeast. May have been an ancient lake bed. Completely cultivated.

Very flat land east of it. Completely but rather thinly snow covered.



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### Tomato Bake

Cook 4 ounces elbow macaroni in boiling salted water for about 10 minutes. Drain and rinse. Combine  $\frac{1}{2}$  cup milk,  $1\frac{1}{2}$  cups soft bread crumbs,  $\frac{1}{2}$  teaspoon salt, 1 teaspoon Worcestershire sauce,  $3\frac{1}{2}$  tablespoons prepared mustard and 1 cup cubed American cheese in a saucepan. Heat slowly until ingredients are well blend-

ed and mixture is creamy. Fold in cooked macaroni and  $1\frac{1}{2}$  cups cubed cooked ham. Pour  $\frac{1}{2}$  of this mixture into a greased casserole. Next, arrange a layer of 4 fresh tomato halves over the macaroni. Add remaining macaroni mixture. Top with the other 4 tomato halves. Cover entire top with bread crumbs. Bake in a moderate oven (375 degrees F.) for 35 minutes. Makes 4 servings.

# ES DIE!\*

## U SPRAY

# L-KILL

## LLER



with  
*Isle Hobbyists*

## Hikers Discover Varied Plants

By HARRY A. WHITTEN

The Hawaiian forest is unusually rich in variety of plant life, not only of native plants but also in the large number of plants introduced here.

Those who took the Waianae hike last Sunday had opportunity to observe the variety.

There is a shrub in Waianae that is endemic to this region, that is, it was found nowhere else in the world when first identified by the botanist, Dr. Joseph Rock.

It is named *Solanum fosterianum*, after Hawaii's second Governor, George R. Carter.

### SHRUB SPREADS

In the years since it has been reported spreading to Waialeale and Waikane, the two valleys adjoining Wai-

anae is the white strawberry guava, seldom seen elsewhere, according to Thomas R. L. McGuire, veteran forester.

These are a few of the examples of plants to be found along one Oahu trail.

The Hawaiian Trail and Mountain Club has no hike this coming Sunday, as members are having their annual luau at their Waimanalo clubhouse.

R. J. Baker, kamaaina photographer and president of the club in years past, has returned from a trip to Europe that included 27 days in the Soviet Union, as well as shorter stays in Poland and Czechoslovakia, topped off by three weeks in Paris.

Mary Jane Bagley has also returned to Honolulu, after working in Washington, D.C.



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